Aslib Proceedings

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incorporating Aslib Information

Problems of getting—and keeping—staff
D. MASON

The training of special library staff
T. E. CALLENDER

Information staff
J. E. L. FARRADANE

Career development
F. LIEBESNY

CALCUTTA UNIVERSITY
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CALCUTTA UNIVERSITY CENTRAL LIBRARY

ASLIB PROCEEDINGS

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ASLIB CALENDAR 1966

January

THUR.27.	Evening meeting at Aslib, 5 for 5.30 p.m. 'Local co-operation—a positive force', by H. A. Chesshyre.

February

TUE.8 – WED.9.	Aslib Course on work with patents.
MON.14 – FRI.25.	Senior Introductory Course to Special Library and Information Work. See paragraph below.
WED.16.	Midlands Branch meeting, Coventry.
THUR.24.	Evening meeting at Aslib, 5 for 5.30 p.m., on Shell photographic library. See paragraph below.

March

MON.14 – FRI.18.	National Library Week. See paragraph below.
TUE.22.	Midlands Branch annual general meeting, Birmingham.
WED.23.	Northern Branch annual general meeting. Sheffield University.
FRI.25.	Biological Group Meeting. Scottish Branch annual general meeting, East Kilbride.
FRI.25 – SUN.27.	Aeronautical Group 15th Annual Conference, College of Aeronautics, Cranfield.

April

SAT.23 – SUN.24.	Engineering Group conference, Leamington Spa. 'Standards, standardization and standards engineering.' See paragraph below.

May

THUR.5 – SAT.7.	Midland and Northern Branches. Joint conference at Llandudno.
WED.18.	Electronics Group visit to Signals Research and Development Establishment.

June

FRI.24. – SUN.26.	Electronics Group 8th annual conference, Ashridge House, Berkhamsted.

September

SUN.25 – WED.28.	40th Annual Conference at Scheveningen (Netherlands).

Evening Meeting, February

A meeting will be held at Aslib on Tuesday 24th February at which Mr R. J. McNeill will speak on the photographic library at the Shell International Petroleum Company. His talk, which will be illustrated by visual aids, will cover the problems of running a photographic material collection and describe the history, growth and present functions of the library at Shell, of which he is in charge, with special reference to the introduction of keywords for deep indexing. After the talk, Mr McNeill will answer questions, assisted by his colleagues Mr H. B. Lascelles and Mr M. A. Scoones.

The meeting will begin at 5.30 p.m. Tea will be served at 5 p.m.

Senior Introductory Course to Special Library and Information Work

A new version of the Senior Introductory Course to Special Library and Information Work will be presented at Aslib Headquarters from 14th to 25th February 1966. The syllabus of this course has been completely revised and recast in the light of the comments Aslib has received on previous courses, including those of previous students, and the course will last for ten days instead of five. It is intended for graduates, or students with comparable qualifications or experience in other fields, who have recently entered special library or information work. Its aim is to give students a broader view of their work than can be obtained by working in a single information department or library, and to suggest ways in which they can increase their knowledge and understanding of information and library work. Lecturers will cover sources of information, and the techniques of organizing and disseminating it. A number of visits to libraries and information departments are included in the programme, and time is also set aside for discussion. The fee for the course will be 21 gns.

A programme and application form are enclosed in this issue, and students are advised to apply early. Provisional bookings will be accepted by telephone or telex. In general only students possessing a degree or comparable qualification will be accepted. Other students who wish to attend the course should consult the Education Officer, Mr Bird, before sending in the application form.

National Library Week at Aslib

During National Library Week (12th–19th March 1966) the following events will be taking place at 3 Belgrave Square:

Open House for visitors 10 a.m. to 5 p.m. daily from Monday 14th to Friday 18th March inclusive. Senior staff will be available for consultation and demonstration of equipment.

Tuesday 15th March at 6 p.m. Reception: Council and staff will be 'At Home' to visitors, who are asked to write in advance for an invitation card, of which a limited number only are available.

Thursday 17th March. A special one-day 'course' will be held for technical or managerial personnel with ancillary responsibilities for information, entitled 'Information on a Shoestring'.

An exhibition of publications on special library and technical information work.

Engineering Group Conference

The 1966 Engineering Group Conference (23rd to 24th April 1966) at Leamington has as its theme 'Standards, Standardization and Standards Engineering'. The trend towards standardization today makes this conference a 'must' for all members of the Group; any other Aslib members who would like to attend would be most welcome. Papers on the first day will cover the field of standards preparation and the British Standards Institution will figure prominently. Papers on international and military standards will also be given. The application of standards will be the second day's theme, and speakers from industry and research organizations have agreed to present papers.

The conference fee will be around £6 5*s*. Further details and application forms will be sent to Group members in due course; non-members may obtain these from B. C. Burrows, Hon. Conference Secretary, Associated Engineering Limited, Cawston, Rugby.

Scottish Branch

The Scottish Branch annual general meeting and one-day conference will take place on Friday 25th March 1966, in the National Engineering Laboratory, East Kilbride, Glasgow, and not, as previously announced, on Friday 18th March. Full details of the programme will be given in the next issue of *Aslib Proceedings* and Branch Members will receive individual notices regarding the timetable through the post in late-January or early-February.

TMIS Technical Meetings Index

Aslib has just received a specimen copy of this index of technical, scientific, medical and management meetings sponsored by United States and Canadian organizations which is intended to supplement, at least from the US point of view, the list of international meetings published by the Library of Congress. It began publication in 1963 and is completely revised quarterly.

The *Index* is comprised of two parts: the data section gives detailed information on the organization of the meetings, including the availability of the papers presented; the indexes to the data section are by date of meeting, keyword, deadline, location and sponsor, with addresses.

This appears to be a valuable addition to the growing attempts to list meetings and the publication of their papers.

The *Index* is available from Technical Meetings Information Service, 22

Imperial Drive, New Hartford, New York 13413. Subscription (in Great Britain) $18.50.

This organization also publishes *TMIS Calls for Papers* which is issued weekly to remind scientists of meetings in their subject fields to which they may wish to contribute papers.

Select Bibliography on International Organization

This selective bibliography, compiled by G. P. Speeckaert and published by the Union of International Organizations, comprises 350 titles of books and other separates devoted to international organization in general, and 730 titles relating to 214 different individual international organizations. It covers the period 1885–1964 and includes indexes to authors and organizations.

It replaces the 1956 bibliography, which has been out of print for some time, and is available from the Union of International Associations, 1 rue aux Laines, Brussels, price 21*s*.

Educational Research

How to find out: Educational Research by D. J. Foskett, Oxford, Pergamon Press, 1965. Price 15*s*.

This book aims to provide, for those about to undertake research or study in education, an explanation of the various types of publication in this field and guidance on how to use them. Thus it is complementary to the *Guide to the literature of education* by S. K. Kimmance (Suppl. no. 1 to *Education Libraries Bulletin*, 2nd ed., 1961).

Subjects treated include teaching and the communication of knowledge, the organization of educational research, the documenting of research, organizing the literature, the library as a teaching instrument, and how to use the literature; specific fields of research are also discussed.

Quite full treatment is given to each subject, with many references to basic texts and reference works. The book is indexed, and illustrated with pages from the most important indexing and abstracting journals in education.

Altogether it is a very useful book, which should result in more informed use of library resources by reasearch workers.

Communications

The February or March 1966 issue of *The Chartered Secretary* will contain an essay by Mr P. E. Colinese, Head of Information Services at the Central Electricity Generating Board Headquarters and member of the Aslib Education Committee. This essay has won the C. R. Heathcock Essay Prize which is awarded by the Chartered Institute of Secretaries. In making the award, the assessors recommended that the essay, entitled 'Improving Communications in Industry, Commerce or the Public Service', should be published in the Institute's journal. Mr Colinese concentrates on improving communications in industry and points out that these are bound to be faulty if untrained staff are asked to perform work which only professional information specialists are competent to do. He stresses that, if information departments are properly established and used, they can provide a valuable service to management and significantly improve the effectiveness of an organization's internal and external communications. Management and business schools are encouraged to include lectures for managers on the functions and value of information services, and organizations are invited to approach Aslib, the Institute of Information Scientists and the Library Association in order to learn more about the advantages of having professionally run information departments.

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Correction

We regret that on page 352, line 21, in our December 1965 issue the word 'Authority's' was substituted for 'authors'.' The sentence should have read: 'Mr Foskett felt this to be an unwarranted interference with authors' freedom, and maintained that in the social sciences a title could well be significant and yet not contain any key words that would be used as search terms'.

PROBLEMS OF GETTING—AND KEEPING—STAFF

D. MASON, F.L.A.,
Librarian, ICI Dyestuffs Division

Paper presented at Aslib Annual Conference, 1st October 1965

IN the American periodical *Office* there used to be a regular feature entitled 'Employee relationships—right or wrong'. Each month there would be three or four brief 'case studies' describing situations which had led to staff grievances, followed by statements of the employees' and bosses' points of view and a little panel for you to tick to show who you thought was right. The accuracy of your inspired guess could then be checked by reading the decision of the official mediator. The details of these cases demonstrated the astonishing number of ways in which staff can react to different circumstances. Study of this variety and its reduction to basic principles goes under the name of 'motivation', and is usually carried out by professional psychologists. The results of their labours are given in papers which have such titles as 'Homeostatic concepts and motivation', 'Hedonic and activation theories of emotion' and 'Self-actualization and related concepts', which are, I am sure, easily readable by other psychologists, but just a little difficult for laymen. However, intrepid informationalists like us, in our eternal quest for new knowledge to interpret, can soon track down the papers which describe the subject in terms we can understand.

The factors involved in 'motivation' tend to divide into two sets. Firstly, there are the so-called 'dissatisfiers' which deal with conditions surrounding the work situation, such as pay, working conditions, company organization and policy. Investigation has shown that these factors can lead to some level of job dissatisfaction, but that except for pay they rarely lead to positive feelings about the job. The manager* of an Information Service has some say in matters of pay and working conditions, but they are largely dependent on company policy.

Secondly, there are the 'satisfiers', which are characteristics associated with a specific task, such as achievement, recognition, advancement and value of the work; these, when present, produce favourable reactions to the work. It is these 'satisfiers' over which the manager has most influence. For this reason it is my intention to concentrate entirely on those factors which we can control in our day-to-day administration of the information service and which lead to positive and favourable reactions to the work being done.

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* Throughout this paper I have used the term 'manager' rather than 'librarian' or 'information officer' when referring to the head of an information service. I have also used the term 'information service' to cover special libraries.

Motivation studies have shown that the size of the work group is a significant factor in job satisfaction. An example of this was revealed recently in a utility company where, in a large room, one hundred girls were engaged in sorting invoices. Work output was low and absenteeism was high. Then some structural alterations made it necessary to separate the girls into ten small groups. From the point of view of an O. and M. expert this would appear to be inefficient, because it involved more walking for supplies and increased the problems of supervision. Yet there was a tremendous improvement in productivity and the absenteeism largely disappeared. Of course any change of conditions may give apparent improvement, but basically an *esprit de corps* had developed in each of the smaller groups. The feeling of belonging will differ from group to group, and subdividing does not always result in additional work satisfaction. If the group is too small and specialized there can be difficulties in holiday arrangements and in promotion. Also the conditions will be right for the development of the Queen Bee phenomenon in which each post gets shrouded in mystique. Small groups can suffer from being over-controlled, but so long as the supervisor recognizes the importance of allowing his assistants as much responsibility and freedom as they can carry the smallish group *should* be most efficient. Many information services are run by small groups, and even in the larger units the division of work is such that the staff usually work in small groups. From this point of view, then, the conditions should be ideal for the development of a good working team.

If you wish to have staff who are competent, capable and happy in their work, they must firstly have a feeling of achievement, that is to say the sense of doing a difficult job well. Secondly, there should be a sense of recognition, that is, the fact that it is widely recognised by both users and management that it *is* a difficult job well done. Thirdly, there is the aspect of responsibility. This means that staff should be fully responsible for the work they are doing, at the level at which they are working. This is probably one of the most important areas, for younger staff in particular soon get dissatisfied if they feel they are not being trusted to do even simple jobs. Fourthly, there should be a clear line of advancement for all staff; and last, but not least, staff should themselves be convinced of the value of the work they are doing.

Now let us look at some of the ways in which we can achieve these desirable ends. It is essential that staff should be fully aware of the long-term policy of the information service and of any immediate developments which relate to this policy. Paul Buck, the former director of Harvard University Library, once said: 'Staff morale cannot be maintained at a high level without a clear understanding of the library's functions and aims. Thousands of long hours of routine work are necessary to keep a library going. If the purpose of the work is lost sight of, it *may* be regarded as mechanical drudgery; but careless filing of cards or shelving of books can bury the resources of a library and cripple its services. Those who do this work cannot be expected to take pride in it and do it well unless they understand its significance and know that the library's director also understands it. Teamwork cannot be expected unless the team's objectives are kept in view and each member of the team is recognized—and recognizes himself—as an indispensable part of the whole.'

To obtain this state of affairs there must be effective *official* lines of communication between all levels of staff, and it is the manager's responsibility to see that such communications exist in his own information service. I stress the word *official* because there is probably no information service in existence which does not have a most efficient rumour-disseminating grapevine, and it is up to us, tough though the job may be, to see that the correct version reaches our assistants before the garbled version, or at least so quickly afterwards that the grapevine is discredited.

(As an aside let me say that I am concerned here solely with the grapevine inside the information service. The information staff should at all times be well-connected to the grapevines of other departments, so that we can stay ahead of information demand.)

The point I wish to emphasize is that all the staff should be able to explain both the policy and the practice of the service. This is particularly important in the case of staff who have regular contacts with users, because the users' understanding of the service will depend largely not on the pronouncements of the manager but on what the information service staff say and do.

Communications within the service should provide links not only from top-brass to juniors but also in the reverse direction. The manager should be easily available to his staff and should let them know that he is aware that they *are* human, that they *do* have problems and that he is prepared to listen and then act if possible. To use the old phrase, he should see that justice is both done and seen to be done, and should be prepared to take up matters with higher management where necessary, even though he expects 'no' for the answer.

The manager must also listen to his staff when they offer suggestions for improving the service. In fact he should encourage them to think positively about such matters and to bring their ideas to him. And when a suggestion is accepted and put into practice he should see that credit is given where credit is due. He only needs on one occasion to take the credit to himself, or to turn down an idea and then some time later reintroduce it as his own, and the word will go forth and few further suggestions will reach him. A manager must at all times keep faith with his staff.

Many years ago, while reading a management periodical, I came across a list of the qualities of a good executive. The ten points given seemed to me to lay down concisely the standards which I would endeavour to set for myself if I should ever become a manager. They also summarize effectively the points I have made so far, so I will read them to you.

1. He possesses moral integrity. His superiors, subordinates and equals know that they can trust him completely.
2. He knows his job.
3. He gets things done. He knows his staff, their strengths and weaknesses. He knows how to call forth the best from each one.
4. He doesn't try to do everything himself. He delegates responsibility with commensurate authority and holds the delegates accountable for results.
5. He gives credit where credit is due. He doesn't brush off good ideas, nor does he steal them.

6. He is fair and impartial. He has no favourites. He is friendly but not familiar with subordinates.
7. He always seems to be ahead of things. His foresight and planning make life less hectic, so that his staff can honestly feel that their energies are being spent on productive effort.
8. He has a keen imagination, together with a saving sense of humour.
9. He has the ability to inspire others to want to work.
10. He has a sympathetic understanding of the other fellow's problems.

The seventh quality should require no amplification, but it is so important in an information service that I cannot overemphasize it. Only by ensuring that our services are consistently user-orientated can we 'enable our staff to feel that their energies are being spent on productive effort'. If your staff knows that parts of the service are redundant and that new company activities are not being backed up, and if you yourself are either blissfully unaware of this state of affairs or so hidebound that you cannot envisage change, then you deserve to find yourself with staff vacancies that you can't fill. I need say no more, I am sure the point is taken.

Although I have been emphasizing the manager's responsibilities to the individuals on his staff, this does not mean that neither his responsibility to higher management nor the responsibility of the individual to management are of less importance. The individual owes it both to management and to himself to accept his responsibilities and to carry out his work to the best of his ability. The manager owes it to his organization to see that the incompetent and lazy are weeded out. A small group, working under pressure, cannot afford to carry passengers, and if nothing is done about the lazy member the rest of the group will soon become dissatisfied and the level of their work will fall off. So, although the manager should endeavour to see that square pegs are fitted into square holes, he should have no hesitation in removing the character who will not fit into any of the jobs in the information service and who upsets the other staff who have to work with him. On the other hand, the work conditions should be such that staff members of average and higher ability are allowed to develop to the best level of which they are capable.

The attribute of a manager which is most appreciated by his staff is *consistency*. In the so-called good old days the consistency usually lay in the severity of management. Here is a quotation from a recent newspaper article on the Birmingham Reference Library: 'Life on the staff of the library around the end of the nineteenth century was severe. When J. D. Mullins, the then City Librarian, a grave man in a black skull cap, walked to his desk at the back of the reading room the staff would stand for him. From about the same period comes a story of a fine of one penny being imposed on the staff for every book dropped. One young man had the misfortune to drop a whole pile right in front of the City Librarian—of whom he brightly inquired: "Is there any reduction for quantity, sir?". He was sacked on the spot.'

Nowadays it is possible to move to the other extreme and take the line of least resistance in staff management. This is as bad as over-severity. What is needed is a fair-minded, understanding and consistent approach so that staff know where they stand. It is also the manager's responsibility to plan and organize the work of the service in such a way that the conditions for job satisfaction are provided. There should be clear lines of responsibility. Each member of the staff should be fully aware of *a* who his immediate superior is, *b* who the staff under *his* control are, and *c* the exact range of work for which he is responsible. Correct planning will avoid on the one hand areas of work for which no one has responsibility and which will therefore be done spasmodically or not at all, to the detriment of the service, and on the other hand areas for which there is more than one person responsible, a state of affairs which will rapidly lead to friction between the people concerned.

I should perhaps emphasize that there is no one form of organization that is right for all information services, or even for one information service at all times. The manager should develop the organization that is correct for his service at that time, and be prepared to alter it as circumstances demand.

The next priority is that of ensuring that staff are matched to their jobs. This is not an easy matter for it may depend on who is available, and it will often be necessary to make minor adjustments between different but related jobs in order to accommodate the personalities of the people in those jobs. In the senior posts, even where great care is being taken when candidates are interviewed and selected, this problem can still arise. However, with flexibility in the organization each person can be allowed to develop in his job along the lines for which he is best suited.

All members of the staff should be provided with the requisite job information to enable them to carry out their work correctly, and should be expected to maintain a high performance. They should also be encouraged to show initiative and to exercise independent judgement within the limits of a clearly laid-down policy. To a large extent this is a question of currect training. By this I mean training in a particular information service. I am not referring to the education of staff which must, of course, precede in-service training.

Up to this point I have been attempting to show the aspects of management that can lead to job satisfaction for all types of staff. I intend now to examine more closely the problems relating to the different types of staff employed in information services, but before leaving the more general section I would just add that the recognition of the value of all members of the information staff depends to a large extent upon each individual member of staff, but the right conditions must be present before the individual can obtain this recognition. No advancement can be expected when the information service is not correctly user-orientated. We must not rely on being taken at our own valuation. Recognition comes through an expanding and dynamic service. The Aslib survey on 'Technical Libraries: users and demands', in examining the *personality* and *policy* of librarians had this to say: 'During this study no cases were encountered of an intrinsically unsuitable or incapable person in charge of a library. We did, however, see several instances of librarians who certainly were not able to use their talents to the full because of restrictive management policy or customer disinterest (the latter probably occasioned or unconsciously fostered by the former). This is an extremely difficult situation for the librarian to cope with, especially if he only ranks as a junior employee. It would appear, however, that, although librarians are often underprivileged and so are operating at a mechanical disadvantage, they are also slightly prone to take refuge in a depressed and passive state of vegetative retreat.' If the man in charge is like this the staff will be even more so and will lose interest in their work, the service will deteriorate, and the vicious circle will be complete.

Let us turn from this gloomy picture to other, possibly more cheerful, matters. There are two major categories of worker in the information field—the professional and the clerical. The professional workers, by and large, divide into those with subject qualifications and those with library qualifications. There *are* rather more B.Sc., F.L.A.s around these days than there used to be, but there are still not enough to affect the issue.

Most professional staff will be concerned with the development of their careers, and this is usually effected by changes of job at strategic times in their working lives. In a large information service such promotions can often take place within the service, but in most services a move to another company is necessary. This turnover of staff, although it affects the level of the service, should not be begrudged by the manager, because it is better for the person who has developed as far as he can in a particular service to continue his career elsewhere than for him to stagnate while waiting for a 'dead man's shoe' promotion which may never come. Also if a manager takes umbrage when someone leaves the word will soon get round, and other members of the staff will take a positive delight in keeping him on tenterhooks by applying for various jobs. It is best for the service when the manager minimises staff turnover by promoting job satisfaction, yet gives his congratulations and blessings to those who do obtain promotion elsewhere.

Now let us turn to the problems connected with staff with subject qualifications. These are recruited from various sources—from other information services, from the organization's own laboratories and works, and straight from university. To judge from comments I have heard over the last year or so the response to advertisements for these jobs is very low, and there appears to be a distinct shortage of young scientists who are willing to work in the information field. There is a need to keep our requirements constantly in the attention of university appointments boards, both by providing them with printed information and also by being prepared to talk to young graduates about what information work really is. For it is amazing what peculiar ideas some of them have. The Manchester Board recently sent me a young physicist who had expressed an interest in information work, and he was most surprised to discover that I did *not* spend my day pressing buttons on a computer control board. What he had envisaged as information work was really data processing.

Vacancies in the information service may attract people from other departments in the same organization, but here there is often a problem of long-term prospects. Transfer to the information department may bring some immediate improvement, but there *is* a level beyond which they are unlikely to go, whereas had they stayed in their old department then, theoretically, there was nothing to stop them rising to the position of, say, Research Manager. In other words, for a subject specialist the information service can be a dead-end job. There is also the factor that many scientists regard it as inferior to true research work, disregarding the fact that much of their work is based on retrieved information. A further point to be taken into consideration is that, except for a few dedicated souls, most people find that, even when balanced with inquiry work, a steady diet of abstracting and indexing becomes completely indigestible after a couple of years.

There are, we know, many subject specialists who have a natural flair for information work and would probably not be happy doing any other job. However, there are not enough to fill all the vacancies which arise. I would suggest, therefore, that we look more and more to *secondment* from other departments as a way of supplying the need. There are many advantages in this. The secondment can be anything from two to five years, which gives ample time to train and receive benefit from the training; the persons concerned will already have a good knowledge of at least a part of the company's interests, and where the industry itself is concerned they will be able to relate the parts to the whole. If during the time they are seconded they are given work of the right level to perform, with incentive to reach a higher level, they will look back upon this time as having been well spent, and after return to their other work will be both informed users of and ambassadors for the service. Some of them may ultimately become managers or directors, and although this may be too late to do anything for you, it should give you the satisfaction of having benefited your posterity.

The training of subject specialists must of necessity be closely connected with the company to which they belong. Only there can the particular methods used and the particular fields of interest be taught. However, there is a need for general background courses similar to the Aslib senior courses, and the need is particularly strong in the provinces. Some organizations which are not prepared to release and pay staff for the London courses would do so if the course were more local, and if it was given at suitable times. There is also a need for orientation courses for different types of industries. Apart from these background courses, though, the majority of the training should be in-service.

The problems connected with employment of professional librarians differ considerably from those of the subject specialists. In the first place they are usually librarians because this is the professional career they have selected for themselves. They have taken courses and examinations to become qualified, and, although they may have ambitions to become chief librarians, they are not particularly worried by the fact that they are highly unlikely to become research managers. In this sense, then, work in an information service is not, for them, a dead-end job. In the past it has not been difficult for information services and special libraries to recruit chartered librarians, because the sort of work done provided a challenge to those who found the atmosphere of the public library too hidebound for their tastes. Also, under the old Library Association examination system it was possible to recruit and train able young assistants, who then obtained their professional education on a part-time basis. At the moment, because of the new examination system, there are no sub-professionals; and because of the general shortage of professionals plus the improved conditions in public libraries, the supply of Chartered Librarians has to some extent dried up.

We shall have to learn to do without the sub-professionals and to train our clerical staff to do some of their work. When, however, the Library Schools are operating at full steam I think we shall see a good supply of Chartered Librarians who have studied and passed examinations in such subjects as 'Handling and dissemination of information', 'Special Libraries and Information Bureaux', and 'Bibliography and Librarianship of Chemistry and Chemical Technology'. If we keep our information service both adventurous and attractive, librarians with these qualifications will want to work with us and not in the special departments of public and university libraries. Furthermore, there seems to be a reasonable chance that there will be CNAA-sponsored courses leading to degrees in librarianship in the not too distant future. If there had been an *imaginative* approach to professional education in the past we could have had such degrees available for at least the last twenty years—still, better late than never. A major point to be borne in mind is the need to avoid narrow specialization in the education of librarians. As Jesse Shera, Dean of the School of Library Science at Western Reserve University, once said, 'We believe that the librarian of the future must be a scholar (not a pedant), whatever his library speciality may be, and that he will be characterized by two outstanding attributes: the first is intellectual depth and breadth, and the second is creativity. Care and feeding of the intellect is the responsibility of the librarian's professional education, for the librarian of the future must be much more than a skilled technician or artisan. He must be able to meet his patrons at least as an intellectual equal, and he must be able to communicate effectively with them.'

The once widely held picture of librarians as bookstampers and caretakers has almost disappeared. However, if we wish to obtain and retain the services of the best librarians in our information services we have also to get rid of the view held in some quarters that they are necessarily inferior to subject specialists. The truth of the matter is that both types of professionals have a great deal to contribute to the development of information services, and that their contributions are related, complementary, and of equal value.

Of course, when we have our regular supply of highly educated young librarians we have still got to train them into our own ways—to break them in as it were. External courses on the ramification of the various industries would be useful here, but the main need is for in-service training plus company orientation courses.

In addition to the training we should provide for recruits of both professional types, we should also bear in mind the need for advanced training for our senior staff. By this I mean that we should endeavour to send them to any courses that the company may provide, or that may be provided by other bodies, on such subjects as 'Organization and Methods', 'Personnel Management', 'Computer programming', etc. Many companies provide a whole range of such courses for senior staff, and the information service staff should be *au fait* with these topics. We should also encourage them to get out and about to professional meetings and conferences, so that they have opportunities for discussion with their colleagues from other organizations.

Last, but not least, let us turn to the problems of the clerical staff, the submerged four-fifths of the information service iceberg. I believe it was a London magistrate who said that mankind was divided into three categories: men, women and young female persons, and that the last-named category was responsible for 90 per cent of the trouble in his courts. Well, like it or not (and on the whole we probably like it), all or nearly all our clerical staff will consist of young female persons possessing GCE 'O' level passes in three to five subjects. They come to us at sixteen, they find husbands by twenty-one and, having obtained a house, a refrigerator, a washing machine, a car and a prospective infant, they leave us at about twenty-four. While they are with us we have little to offer them in the way of advancement other than routine increases of pay, and nowadays they have small opportunity to pass the educational barrier which separates them from professional posts. Some of them are quite unconcerned about this state of affairs, and so long as they are kept reasonably happy will give consistent, but rather mediocre, service. There are, however (and these are the ones we should encourage), many who are really keen on their work and who want to be steadily increasing their expertise. To be able to do their jobs properly they must receive good in-service training, and it is not enough just to train them for one job and then leave them to get on with it. Even if they are only going to fill this one post, training in all branches of clerical work done in the information service is bound to make their work much more interesting, and, because they can see how their part relates to the whole, their work will be done more intelligently. Beyond this, though, I am certain that we must offer them some form of limited qualifications—'Library Assistant's Certificate', 'Information Technicians Certificate', call it what you will—that will widen their approach to the work and encourage them to feel confident and competent in all that they do. If we can have a higher grade for these clerks who are keen and interested enough to take a part-time evening course leading to this certification, then so much the better. Virtue is not always its own reward.

Among our clerical staff there will always be the few who do not leave and who, if they have any ambition at all, will not wish to be doing the same work at thirty-five that they were doing at eighteen. We must see that they have the opportunity for advancement in the clerical field, and this will mean, in most cases, promotion to higher posts in other departments. If they have been properly trained, then, with their intelligent appreciation of clerical routine, they will adapt easily to new jobs, and they too will be valuable ambassadors for the library wherever they go.

In this paper I have had to touch lightly on a large number of topics, and it is rather difficult to sum up other than by saying that if *you* want to have an adequately staffed information service then *you* must do your best to see that your staff are fairly treated and properly trained, and that they know they belong to and are an essential part of a well-organized and dynamic service. And I would like to conclude with a further quotation from the works of Paul Buck which puts the whole matter into perspective. I should add that, being Director of Harvard Library, he uses the term 'Librarian', but 'Information Officer' would do just as well.

'First, each librarian (and, most of all, the chief administrator of a library) should strive continually to be a truthful and effective interpreter of his profession and his institution:

— to those on whom the library depends for support,

— to those who use the library,
— to its own staff, and
— to everyone who shows promise of becoming a desirable recruit to the profession.

Second, the importance of personnel cannot be exaggerated. An informed staff with high morale, working together harmoniously, is indispensable; without it, no library can be good and no administration can be successful.

Third, responsiveness to the needs of users is the paramount virtue in a library, and responsiveness demands, in addition to personnel of high quality, strong collections and consistent support based on sound financial policies.

Fourth, co-operation by libraries has helped to produce many of librarianship's outstanding achievements, and its potentialities have by no means been exhausted.

Fifth, technological innovation should be welcomed and fostered whenever it promises to reduce routine drudgery and to make the library more responsive to needs—whenever, in other words, it promises to increase rather than diminish the humane quality of the library.

Actions, of course, speak louder than words. . . . Much more remains to be done. . . . *There is no justification for complacency.*'

THE TRAINING OF SPECIAL LIBRARY STAFF

T. E. CALLENDER, F.L.A.
Borough Librarian, Croydon
Chairman, Library Association Education Committee

Paper presented at Aslib Annual Conference, 1st October 1965

MR MASON, in his paper, used the term 'manager' to denote the person at the head of or in charge of an information service. I shall use the word 'librarian' in the same sense, partly because the word comes easier to my tongue than 'manager', but mainly because I hold most firmly to the basic concept of the unity of librarianship. At the risk of a head-on collision with Mr Farradane, I will say at the outset that I speak to you in the belief that information officers, information scientists, special librarians—calling them whatever they choose to call themselves—are, in fact, practising all or part of the profession of librarianship in a particular context.

I am here because I am Chairman of the Education Committee of the Library Association and thus, within limits, enunciate the Library Association point of view. I say 'within limits' because, as I know to my cost, he would be a bold man who claimed to know that he would have the unanimous support of the membership of the Library Association for any view which he expressed on any topic.

I was told, in my brief for this meeting, that I was to choose some title indicating 'the raw material', and it seems to me that the words 'the raw material' are as good as any, because what we are concerned with is the processing of available human raw material to produce the finished product, which is a librarian with the background and abilities which your special fields can use.

There are two main classes into which we can divide our raw material. They are, basically, those who come to be processed with a view to becoming the librarians or managers and those who will, with suitable training, fill the non-professional posts in our organizations. I believe that these are two separate classes and that progression from non-professional to professional is likely to be rare and fortuitous.

Recognition of the components of the potential professional group is a first essential step before considering the best means of processing them. I think they can be identified in the following categories: first, those whose choice of a career in librarianship or, more narrowly, in the information field is made at the pre-A Level stage in a grammar school career; second, those whose choice of a lifetime's work has led them to a degree in a science or a technology and who, before the end of or immediately after their degree course, decide or are persuaded to use their talents and knowledge in the field of librarianship; third, those who practise for a while as scientists or technologists and who, after some period of practice, decide to turn librarian in a field where their scientific or technical abilities and knowledge will be relevant.

If this is a reasonable grouping of the professional raw material, the problem of its processing needs to be considered. The proposition that we need an educating and training process conceived *de novo* can be attractively argued, but I believe that there is more profit in using, and if necessary adapting and modifying, existing means rather than trying to make, and get acceptance for, a new educational process.

The existing means of educational processing are courses preparing for the Part 1 and Part 2 Examinations of the Library Association—that is, two-year courses in Colleges of Commerce, open to aspirants whose grammar school education has reached A Level standard, and post-graduate diploma courses, of which that available at London University is the oldest and the newly founded Graduate School of Librarianship at Sheffield is the newest.

Of the three groups which I have identified, two, in my view, are already provided for by existing educational bodies.

Firstly, the grammar school leaver. Until recently I would not have claimed that courses preparing for a Library Association qualification could produce, in other than exceptional individual cases, librarians properly equipped to work effectively in the field of scientific and technical information. Only a few years ago I should have had to admit in honesty that the Library Association examinations had a humanist bias and a public library bias which were, in effect, a denial of my concept of the 'one-ness' of librarianship. This is no longer so. A first significant step was taken when the Library Association accepted as a component of its pre-entry qualification a General Certificate of Education pass in mathematics or a science as an alternative to a classical language. The second step into a wider field was taken when a syllabus was produced which enabled a candidate, if he wished, to pursue a course of studies slanted towards a qualification relevant to information work.

Time does not permit me to display the current Library Association syllabus to you in detail, and I need not, I think, do more to reinforce my point than to remind you that the 1964 syllabus of the Library Association enables a candidate, after a basic study of the core subjects, to prepare for examinations concerned with special libraries and information bureaux, the handling and dissemination of information, and the bibliography and librarianship of a subject chosen from the range: sociology, political, science and law, mechanical engineering, civil engineering, electrical engineering, chemistry and chemical technology. I will not labour this point beyond saying that if the range is not enough it can be increased at your wish.

For those who choose while at grammar school to work in your field this syllabus, modified or enlarged to meet your formulated requirements, offers, I suggest, a suitable training process.

Next for those whose decision to work in this field is made while becoming, or immediately after becoming, a science graduate, the post-graduate course, slanted as is that at Sheffield, already offers an acceptable training. I think there could be more post-graduate courses like this, and I think there will be more if there is a ready acceptance of the Sheffield-processed science graduate. We can, working together, have a powerful influence on the content of such post-graduate courses, since we can assume that any new post-graduate courses will follow the precedent established at Sheffield and at Queen's, Belfast, where the Library Association is directly represented on the universities' appropriate Board of Studies.

It seems to me common sense that Aslib and the Library Association should pursue a common cause in this matter of representation on boards of studies and that our object should be to secure that in every case there is representation on a university board of studies by librarians acceptable to both Aslib and the Library Association. A few years ago such a proposal would have been fanciful. In the climate of opinion which prevails today I think the proposition appears to everybody concerned as no more than plain common sense.

There remains the practising scientist who wishes to convert. This is difficult, and I do not think there is a satisfactory conversion process open to him unless he is able to take a full-time post-graduate course, I know that in many cases this is not possible, either because the individual concerned cannot, as a mature adult with all the 'balls and chains' which go with that state, finance himself for yet another student year or because his employer will not part with him for a year, or will not pay his expenses. The alternative which is being advised for such people is day-release. This should, I think, be resisted as unlikely to produce the desired end-product; as not likely to find teachers willing to undertake to teach graduate day-release students; and as having the single dubious merit of enabling employers to get a librarian on the cheap.

With this exception, I suggest to you that the existing means of educational processing of our raw material are adequate, or can be made adequate, for our purpose, and I would remind you that they have the great advantage that they already exist and *that they work.*

There is another process in prospect. This is the degree course in librarianship which may be set up by the Council for National Academic Awards. This body, as you know, will confer degrees in subjects not at present accepted as appropriate for study at degree level. The intention is to bring existing teaching and studies up to this level, and in our case this means the conferring of a degree in librarianship after a course at an existing library school. The Library Association is associating itself with the work of the CNAA, and, for my part, I am working on the well-established principle which advises that if one can't beat 'em, one should join 'em!

The Library Association is not, as such, represented on the Central Committee of the CNAA, but it is understood that both Aslib and the Library Association will be represented on the appropriate Board of Studies which considers degree courses submitted to it by library schools. In considering such courses the Library Association will, I am sure, work on the principle that it will scrutinize courses and decide whether or not their professional component is sufficient to enable the Library Association to admit to its Register, without further study or examination, holders of a CNAA degree in librarianship. Here, I think, the two associations will have to work hand in glove, and I do not think that the Library Association should ever consider registration for holders of a CNAA degree conferred after a course of studies which was not as acceptable to Aslib as it was to the Library Association.

I have not time to say as much as Mr Mason would wish me to say about the Assistants' Certificate. Before the bell tolls I would say that the need for a certificate for the non-professional worker is accepted by the Library Association, but that, because a large section of our membership fears that if we issued such a certificate it would be seized on by local government employers as a cheap alternative to professional qualifications, the Library Association is seeking to promote the issuing of such a certificate by some other body with whom it could work and could exert, if not control, at least formative influence.

At present we are negotiating with the City and Guilds of London Institute and (somewhat to our surprise) with the Royal Society of Arts, and if our negotiations (which proceed at a rather majestic pace) are successful one or other of these bodies will offer a Library Assistants' Certificate which will, I think, be useful to the non-professional staff of special libraries, university libraries and information bureaux, without jeopardizing the hard-won acceptance by local authorities of the qualification of Chartered Librarian.

INFORMATION STAFF

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Paper presented at Aslib Annual Conference, 1st October 1965

I AM here to speak on behalf of the Institute of Information Scientists. Mr Mason has described an information department as an office with several sub-professionals and a submerged four-fifths of clerical staff. I do not recognize the description; perhaps it is a special library—I wouldn't know! Nor will I be drawn by Mr Callender's suggestion that there is one all-embracing librarianship profession, except to observe if there is it includes people whose tasks differ so greatly that no one training could encompass them all.

It is necessary first to define information work. This is a specialization for a scientist on the literary side, whose task is to obtain all kinds of scientific and technical (perhaps also economic) information in response to requests, or, knowing individual needs, in advance of request, and to disseminate it in various ways to individuals or organizations, or internationally. The job is to find the facts, to be able to evaluate them (in the sense not of making decisions, but of comparing and contrasting facts), and to discuss them with those requiring the information. This will entail such tasks as editing, abstracting and producing abstracts bulletins, perhaps translating, preparing surveys and evaluative reports, and classifying and indexing for information retrieval.

The type of person required is a science or engineering graduate with a research outlook, for the job entails serving research personnel and others, and is a branch of research itself. The information scientist should have wide interests and in fact be interested, to some extent, in knowledge for its own sake. As Dr Alexander King once put it, the information scientist must have appropriate and adequate subject knowledge which, while not as deep as that of the specialist, should be wider and just as sound. Scientific training at graduate level is essential for imparting the breadth of outlook and perhaps the research attitude; the information scientist must always be eager to go on learning, and he must remain a scientist in his approach to information work. In addition he should cultivate some knowledge of foreign languages, at least good technical reading standard in two (preferably more) languages. Now that only 50 per cent of the literature is in English, not to mention polyglot journals, such linguistic ability is essential for information work. Finally, he should have a good knowledge of English and be able to write grammatically, logically, and accurately; while the average scientist has the reputation for writing badly, the information scientist, who often writes for him, must be above reproach. In personality the information scientist should also be able to speak well, be a good mixer and have considerable tact; he will have the perennially difficult task of drawing out of a questioner what it is he really wants to know, and this always needs tact. In fact, since the job involves satisfying people with whom he is in direct contact he must be able to inspire confidence and maintain good relations; an important corollary is that he should make sure that the information he provides is always *correct.*

There is today a considerable shortage of information staff. This is partly because the universities' appointments boards have been slow in recognizing this profession and telling students about it. Information science, however, is now as good a career, salary-wise, as industrial research, and offers a stimulating profession for the man who has research interests yet does not wish to specialize, and is interested in a wide field of learning, in languages, and in making personal contacts. A salaries' survey recently carried out by the Institute, and soon to be published, supports the above conclusions. Those who have carried out bench research, especially in industry, are even more useful when they turn to information work. The need for information scientists will undoubtedly grow, and must be met by means of adequate publicity.

The tasks in information work have become increasingly complex and training on the job is no longer adequate, especially since the range of tasks carried out in any one organization rarely even approaches the full possibilities. Moreover, an adequate training course provides not only instruction in techniques but education in the wider sense. The Institute of Information Scientists established a syllabus of education which Aslib has approved. This syllabus comprises all aspects of the work including the latest advances in information retrieval on computers; and the Institute is continually watching the position to keep the syllabus up to date. Courses are now being given in accordance with this syllabus at Northampton College of Advanced Technology, London (soon, it is hoped, to be the City University); there is a one-year, full-time diploma course and a two-year evening course (two evenings a week in term time) leading to the Certificate of the Institute. This was the first course of its kind in the world, and is still the only complete training. The courses are post-graduate (honours degrees), though a few students with lesser qualifications can be accepted for the evening course, if there is room; this year the new first-year evening course has been quite full, so that we have had to refuse some applicants. There is a shortage of adequate teachers, and if we are to provide more courses we shall have to face this difficulty. It is hoped that industry will realize that they can best fill posts by engaging graduates and sending them almost immediately to the Diploma course. Such students will then be equipped to undertake with confidence many tasks, such as producing an abstracts journal, or devising a special classification or an indexing system, and will be experienced in searching for all kinds of information. Even so, the information worker himself will do well to make at least one move in his career so as to broaden his outlook. The scope of information science is widening rapidly; if Mr Callender would suggest that librarianship and information work are all one spectrum—and I would agree that there is an area of overlap, though the subjects are approached from a different standpoint—I would point out that, at the opposite end to

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librarianship, information science is extending to fields which are quite different in character.

I would also like to mention the need for research in information handling as a necessary adjunct to teaching and training, and as a growing need. It is hoped that in the near future students will be able to obtain an M.Sc. by the full-time course and, if they wish, continue in research for a Ph.D.

For the proper development of the work, it is also very desirable that management should be aware of the possibilities of information work. This means that the scope of information science should be taught in management courses. As was suggested many years ago at an Aslib conference, information must become a seventh function of management, who must not only realize its potential value but must see that each industry is organized to make the fullest use of the information provided. I look forward to the time when the information department will be the key department in an industry, keeping one side informed of what the other is doing and keeping all sides in touch with the outside world.

CAREER DEVELOPMENT

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Chairman, Aslib Education Committee

Paper presented at Aslib Conference, 1st October 1965

MR MASON has already referred in his paper to the three main streams of professional and semi-professional training and education available to librarians and information scientists in this country. Although the distinction between these two so patently different types of animal has not been drawn with a sufficient degree of accuracy, it is nevertheless true that only one of these streams is specifically directed to the training of information scientists, and this is, quite rightly, directly or indirectly under the aegis of the Institute of Information Scientists.

Before going any further I should perhaps state quite categorically that of the several hats in my possession the one I am wearing just now is that of chairman of the Aslib Education Committee and that my main concern is, of course, the provision of training facilities for the membership of Aslib. To put the whole matter into historical perspective, it may perhaps be useful to cite Aslib's Memorandum of Association—which was executed on the 7th April 1949, and which presumably reflects the 1926 memorandum—namely that its aims are, *inter alia:*

> 'to promote professional knowledge amongst documentalists and persons working in special libraries and information bureaux *to hold classes to conduct examinations and to grant* . . . certificates for competency in professional knowledge provided that every such certificate shall contain . . . a statement to the effect that it is not issued with any statutory or government sanction but solely by the authority of the Association' (i.e. Aslib).

Although Aslib has possessed these permissive powers for many years it did not choose to exercise all of them, perhaps as a matter of policy. This policy, and I refer especially to the powers of conducting examinations, was debated several times and was most carefully scrutinized during discussions at the 1957 Conference at Scarborough.

Since then, it has been Aslib's unwritten point of view that it should not concern itself *for the time being* with long-term or full-time classes or courses, nor award certificates other than those of attendance. Its abnegation of such activities led indirectly to the formation of the Institute of Information Scientists which pays specific attention to the fields of professional training of information scientists.

Aslib has, however, continued to maintain its programme of special junior and senior introductory courses, courses on work with Russian material, introductory courses on work with patents, 'Personal' courses, etc., as a regular contribution to specialized education. In addition, Aslib has paid special attention to promoting developments in education for librarianship and has liaised with many bodies, such as the Library Association, the Association of British Library Schools and the City and Guilds Institute in an effort to further the interests of special librarians and information workers.

In recent years these discussions and consultations have increased in frequency and importance. This is not at all surprising in view of the increasing stress laid upon education and the realization in ever wider circles of the importance of specialized training in particular. Just over a year ago a new body was created to co-ordinate higher education in specialized fields. This is the Council for National Academic Awards (CNAA), of which our President is the Chairman. One of the topics it will discuss is courses in librarianship leading to the Council's degree. The Association of British Library Schools had for some time been formulating a syllabus for degree courses and these discussions were attended by Aslib's Education Officer (as an observer), and on some occasions the Chairman of the Aslib Education Committee was specially invited. Aslib's main contribution has been to ensure that sufficient time was allowed in the syllabus for lectures on special library practices, and that the eventual graduate would have a working knowledge of at least one foreign language. The CNAA has assured Aslib that our voice will be heard when syllabuses will be considered by the CNAA boards of studies.

It is of course realized that not all entrants to the profession of librarianship would wish to, or indeed be able to, qualify as graduates and that there would have to be a large body of 'technicians' comparable, say, to the laboratory technician in a research laboratory staffed largely by graduates. In many libraries, and even in special libraries, there is a steady flow of young women who, on entry into the profession, work mainly on loans or in the cataloguing section without doing specialized work. Before they have even half a chance of obtaining any qualification in librarianship, they get married, leave the profession and have babies, usually in that order. However, after they have disposed of their children to some school or other they have the strange yearning to return to library work. And, of course, they have nothing to show by way of a qualification and have also by that time no longer any ambition to attain higher qualifications. It is for these people primarily that a certificate of proficiency in the lower skills is intended. Whilst this principle has been agreed on by most interested parties, the rather minor question of who should award such a certificate has given rise to very heated exchanges. I have even heard a chief librarian say that a prospective employer might be misled by the proposed 'Library Assistants' Certificate' into thinking that its holder was a Chartered Librarian. I would rather think that this particular chief librarian has a lower opinion of the standards of literacy among prospective employers than many of us possess. These rather trivial discussions on the authority of the certificate have caused considerable delay in the implementation of plans which were formulated about eight years ago by Mr D. J. Foskett, the librarian of the

University of London Institute of Education. I hear, however, that the North-Western Polytechnic has decided to wait no longer and is starting a course for the Library Assistants' Certificate in the very near future.* Meanwhile the City and Guilds Institute is seriously considering awarding one of its certificates to students who have passed a course based on an approved syllabus. Both the Education Officer and Chairman of the Aslib Education Committee have been elected as members of an advisory panel for these courses.

Although this talk is intended mainly as comment on Mr Mason's excellent paper I would like to take this opportunity of expanding my field slightly by giving an account of the current problems with which your Education Committee is concerned. Of these, two seem to be of greater importance than the others. Firstly, it is felt that the difference between the senior and the junior courses at Aslib, with regard both to depth of treatment and manner of presentation, is not sufficiently great. It is therefore intended to extend the duration of the senior courses and to alter their character by making them residential whenever possible. The longer duration will also permit a more comprehensive treatment of the subjects discussed. One variation which has also been considered is the admission of overseas students to such courses, while another suggestion is to have special summer schools for overseas students.

The second item is concerned with the growing number of schools of management studies whose syllabuses appear to give too little attention to the whole subject of information work and retrieval. The Education Committee has therefore drafted a memorandum which is to be circulated to these schools and used as a basis for discussion at a forthcoming conference for management schools to be held early next year.

Perhaps I can best summarize by painting a picture of the state of education in librarianship, say in ten years' time, as some of us visualize it in the rather confusing and confused conditions of today. Special librarians in 1975, or thereabouts, will be of three basic types:

1. the completely unqualified rank and file who will very likely have to handle plastic-bound incunabula, i.e. books of pre-1950 vintage, and to change the fuses in the overworked retrieval computer.
2. the technician holding a Library Assistants' Certificate who will supervise the above-mentioned rank and file, and be responsible, for example, for the ordering of publications, their routine dissemination, etc.
3. the fully qualified CNAA graduate librarian, whose training will include a discipline other than librarianship and a foreign language, representing the professional level of attainment. This degree is intended to be equivalent to a baccalaureate, and higher levels of attainment will therefore be equivalent to Masters, and possibly even Doctors of the relevant discipline. Such higher levels obviously imply some measure of specialization and present plans for an M.Sc. degree in Information Science at the Northampton College of Advanced Technology, soon to become the City University, will be one example of that higher level.

We may expect that the regular means of training and education will be something like this, but superimposed on this structure will be the specialist courses, such as Aslib is providing at present, and, of course, the extended courses which, we are sure, will by then be in full swing. These grandiose plans can, however, be realized only if a sufficient reservoir of suitable teaching personnel can be established. This particular stage may present more difficulties than such problems as accommodation, financing of students and facilities for practical training.

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* This course began on 26th October 1965.

However, the future is bright. If it has taken the Institute of Information Scientists only five years to start its rather revolutionary courses in information science and to proceed to award its certificates, surely it should be possible to reach the targets I have just described in ten years from today.

DISCUSSION

Mr C. S. Sabel (Central Electricity Generating Board) asked if secondment were fair to the person who was seconded. The interruption in his career could prejudice, or delay, his chance of promotion. Since many departments would mistakenly consider experience gained in an information service as of little value to a man's scientific career. Mr Mason had also spoken about teamwork and the sense of identification found in the smaller information units. Would he comment on the difficulties which arose when sub-division led to staff no longer recognizing the one-ness of the organization? The two aims—to ensure that staff recognized unity of the whole library/information complex and to allow them to specialize adequately—were opposed to each other. Where, in Mr Mason's view, was the compromise to be made?

Mr Mason replied that in his experience secondment to the information department did not interfere with a man's promotion. He knew of one case in which such a person had expressed a preference for information work and eventually became Chief Information Officer in another company. On the second point he considered that friction always occurred between sub-divisions and needed constant damping down.

Mr B. T. Stern (BIP Chemicals) said that the very fact that a candidate for secondment to information service was ready to accept non-experimental work showed that he was mentally attuned to an ultimate administrative post in management. This in fact was likely to be his lot, since a management which instituted secondment would itself be adventurous in outlook and therefore likely to make the best use of its internal potential. Secondment was thus likely to be acceptable to the candidate for secondment.

Mr Mason agreed.

Miss M. D. Gauntlett (Kodak Ltd) asked if the speaker had any views on the employment of older married women in place of younger, 'female clerical staff' with a short working life.

Mr Mason replied that when such people were available they were good value for money.

Dr W. E. Batten (ICI) said that sub-professional staff were the root of the problem. Having sub-professional grades would raise the status of the professionals, and put them on a par with other professional workers. It was our duty to devise some form of training and promotion for sub-professionals.

Mr Mason said he agreed that there should be some form of training for sub-professional staff on a national basis, at least for special libraries.

Mr C. W. Hanson (Aslib Research Department) said that the gigantic wastage of woman-power was one of the major problems of the western world. Could not a system of part-time work be arranged to fit the needs of married women?

Mr Mason said that in his experience part-time working was not a success.

Mrs G. F. Taylor (Zinc and Lead Development Association) said she felt quite strongly about the intake of graduates direct from university. Experience in an industrial laboratory was invaluable to the potential information officer. After five or more years 'at the bench' his approach both to abstracting and to the answering of queries, was much more practical. She also supported Mr Hanson's remarks regarding the employment of married women. There was still too much bias to be found in many organizations—extending even to the exclusion of superannuation benefits. She had found that, with a little 'give and take', the morale and work of the department could be improved immensely. Information staff were, after all, mature people providing an important service and they should be treated as such.

Mr Mason said that he too preferred people with experience in the company.

Mr C. A. Wide (College of Engineering Technology, Rugby) asked if the Library Association had given serious consideration to the idea of a sandwich-type course. The sandwich course had obvious advantages for the training of information workers in industrial libraries. It would also attract subsidy under the Industrial Training Act.

Mr Callender said that the Library Association was not responsible for organizing courses.

Mr Liebesny said that in the case of CNAA degrees, a sandwich course would be undesirably long—and that in any case, sandwich courses were going out of fashion.

Mr Farradane said that there had been a demand for sandwich courses at the College, but that it was difficult to find teachers.

Mr B. Agard Evans (Ministry of Public Building and Works) said that it was most interesting to learn of the ideal professional coming out in 1975—but we were now in 1965. At all times the good special library and information service required a team, including *a* a subject specialist, *b* a linguist, and *c* a full-blooded librarian. It was practically impossible to find people with all three qualifications. Information service staff needed therefore the opportunity to learn something of other facets of information work than they were personally concerned with. For this the Aslib short courses had been very useful. Mr Agard Evans also advocated strongly the retention of evening classes; there was, he considered, no substitute for them, especially for those who came rather late in life to information work—and many of these brought very valuable experience to the team. On secondment, the Ministry was operating a scheme for obtaining secondment of technical assistants (e.g. experimental officers) by offering them temporary promotion. In general, when they returned to their divisions they retained their temporary rank and therefore did not suffer in promotion; in fact they probably gained considerably in knowledge of the work of the organization as a whole.

Mr Callender said that evening classes were good for late entrants, but bad for general preparatory education.

Mr Farradane said that secondment often worked well with people who were willing to help part-time.

Mr R.L. Ballard (Reed Development Services Ltd) said they had heard from the speakers about the education and training of people entering and working in the information field. They had, however, heard nothing about the education of management on the need for high-calibre specialist staff and on adequate remuneration for them. The IIS and LA, as professional bodies, could not easily become deeply involved in this problem. Had Aslib any plans for educating management in this matter?

Mr Liebesny said Aslib had not.

Mr R. Beer (British Hydrocarbon Chemicals Ltd) said they had heard the sandwich course condemned. What did speakers think of students doing practical work in libraries during their vacations?

Mr Callender and Mr Mason agreed that this was an excellent practice.

Mr T. Brimelow (Leeds School of Librarianship) said that Aslib already participated implicitly in the Library Association's examinations, in that prominent members were examiners and assessors. There was therefore an informal linkage. Mr Farradane hoped to attract people to information work who were capable of rising to the level of Research Director. Present salaries in information work would, however, not attract people of this calibre.

Mr A. J. Dickson (Ealing Technical College) said that Mr Mason's paper appeared to prove that librarianship was basically a social science; he did not agree that special libraries in industry were distinct from information departments in university and public libraries. Did Mr Callender think that there should be interavailability of the three library schools in London? If an Institute of Librarianship were set up in London, would Mr Farradane like to see the Institute of Information Scientists become part of it? He hoped that Aslib recommendations to CNAA included high library standards in colleges presenting CNAA degrees.

Mr Liebesny said that Aslib had made a strong point of this in its recommendations.

Miss E.F. Heilpern (Distillers Co) made a plea for the inclusion of information work in science degree courses.

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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to Foreign Languages

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WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Rumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

TRANSLATIONS FROM TURKISH. All subjects. F. P. Scott, 4 Uphill Grove, Mill Hill, London NW7.

TRANSLATIONS: TECHNICAL, SCIENTIFIC, all west-European languages. J. Smuts, B SC (ENGINEERING), FIL, 12 Thorndene Avenue, London N11. LABurnum 7723.

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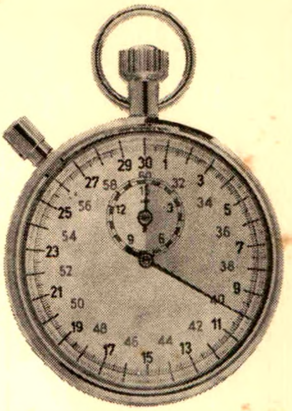

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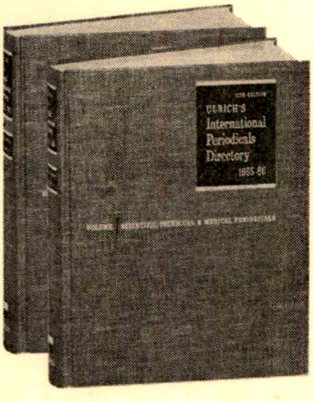

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Volume 18 **February 1966** **Number 2**

ASLIB CALENDAR 1966

March

MON.14 – FRI.18.	National Library Week. See January issue, p. 2.
TUE.22.	Midlands Branch annual general meeting, Birmingham.
WED.23.	Northern Branch annual general meeting. Sheffield University.
FRI.25.	Biological Group Meeting. Scottish Branch annual general meeting, East Kilbride.
FRI.25 – SUN.27.	Aeronautical Group 15th Annual Conference, College of Aeronautics, Cranfield.
TUE.29 – FRI.1.	Junior Introductory Course. See paragraph below.

April

SAT.23 – SUN.24.	Engineering Group conference, Leamington Spa. 'Standards, standardization and standards engineering.'

May

THUR.5 – SAT.7.	Midland and Northern Branches. Joint conference at Llandudno.
WED.18.	Electronics Group visit to Signals Research and Development Establishment.

June

FRI.24 – SUN.26.	Electronics Group 8th annual conference, Ashridge College, Berkhamsted.

September

SUN.25 – WED.28.	40th Annual Conference at Scheveningen (The Hague).

March meetings

Because Aslib is taking an active part in National Library week, 12th–19th March (see January issue p. 2), it has been decided not to hold the Evening Meeting which would normally have been arranged for the third week in March.

Scottish Branch Annual General Meeting and Conference

As announced in last month's *Proceedings,* the annual general meeting and conference of the Scottish Branch will be held on Friday 25th March 1966 in the National Engineering Laboratory, East Kilbride, Glasgow. Detailed notices will be circulated to all members of the Branch, but particulars of the general programme are given here for the information of anyone else who may be interested. A cordial invitation is extended by the Branch Committee to members and others to participate in the conference.

Arrangements have been made for three speakers:

Dr P. R. Thomas of the Scottish Horticultural Research Institute, Invergowie, Dundee, on 'A client's viewpoint—What the research worker expects to get from his library'.

H. I. Hunt, Borough Librarian, Motherwell and Wishaw Public Libraries, on 'Help for local industry—What the public library can provide'.

A representative from OSTI (Office for Scientific and Technical Information) on the OSTI programme—training, education, surveys, etc.

The inclusive cost for the day (lectures, coffee, lunch, tea and gratuities) will be 25*s*. Registrations should be sent not later than Tuesday 15th March to the Branch Honorary Secretary, Mr W. H. Rutherford, Assistant Secretary and Librarian, Royal Society of Edinburgh, 22 George Street, Edinburgh, 2.

Aeronautical Group

In the December issue of *Proceedings* information was given about the Annual Conference to be held on 25th to 27th March at the College of Aeronautics. There will be one other paper in addition to those announced then; this will be by Mr M. Yelland, Research Officer of the Library Association, and will be on 'Work of the National Reference Services Subcommittee and "Access to Information"'. As stated before, application forms will be sent to members of the Aeronautical Group; others who wish to receive application forms should apply to Mr E. J. MacAdam, 74 Stancliffe Road, Bedford.

Biological Group

A one-day meeting of the Aslib Biological Group, to discuss the problem of training for university students, research workers and librarians in the biological field, has been arranged for Friday 25th March. A programme of this meeting, which will serve as the annual general meeting of the Group, will be sent to all members. Others interested should write to Miss P. I. Edwards, Department of Botany, British Museum (Nat. Hist.), London SW7, not later than Monday 21st February.

Transport Group

In January 1964 twenty-eight librarians, information officers and others interested met informally and founded what was to be known for the following two years as the Transport Information Group. At its annual general meeting last October the results of a postal ballot came out in favour of seeking incorporation with Aslib, whose Council approved the request at a meeting just before Christmas. Thus yet another Group has been formed and has held its first meeting under new colours jointly with the Institute of Transport's Graduate and Student Society this January, in the form of a lecture on Transport Statistics. A full programme of events has been arranged. Having been in existence for over two years under another name, the Group already has a strong nucleus of members, but new ones are always welcome. A quarterly newsletter, *Transport*, is circulated to members. An ambitious publications programme is also planned, including a series of bibliographies.

Further information may be obtained from the Honorary Secretary, Miss L. G. Clark, Ministry of Transport, London.

Textile Group

Some time ago, the Organisation for Economic Co-operation and Development (OECD) produced a report on information services available to the textile industry in member countries. The Textile Group was subsequently asked by the Textile Institute to set up a working party to report on textile information services in this country. The Working Party is now drafting its report.

If any members of the Group have seen the OECD report and have any comments or suggestions to offer, the Secretary, Mrs M. I. Lomax, of the Tootal Research Department, English Sewing Ltd, 56 Oxford Street, Manchester 1, would be glad to receive them.

Junior Introductory Course

A junior introductory course to special library and information work will be held at Aslib from Tuesday 29th March to Friday 1st April. It is intended for students who have recently taken up junior posts in special libraries and information departments, and is designed to provide those who are occupied mainly in routine duties with an understanding of their work and its place in the organization which will help them improve their efficiency and give them an incentive to progress to more exacting tasks. The course will include lectures on various aspects of library and information work, visits to other libraries and information departments and a final discussion session which will include ways of following up the course with further study. The fee for the course will be seven guineas.

A programme of the course is enclosed in this issue, and applications to attend should be made on it. As these courses are usually heavily over-booked, intending students are advised to book early. Provisional bookings will be accepted by telephone or telex. Students holding a university degree or in a senior position will not be accepted for this course, and are advised to wait for the senior introductory course.

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Taylor, L.	Yorkshire
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R.S.I.S. Conference

The 1966 Annual Conference of the Reference, Special and Information Section of the Library Association will take place at Aberdare Hall, University College of South Wales and Monmouthshire, Cathays Park, Cardiff, from Friday 1st to Monday 4th April. The principal speakers will be J. F. W. Bryon ('A national information service and the general public'); L. Corbett ('Potential benefits of a national reference and information system for special library users and staffs'); and J. R. Sharp ('Information retrieval—achievements and prospects'). There will be opportunities for a full discussion of these papers. The programme also includes other speakers and a wide range of visits. The conference fee of £5 covers full residence from dinner on 1st April to breakfast on 4th April. Day visitors on Saturday and Sunday (2nd and 3rd April) will be charged 17*s* 6*d* for each day, including lunch and dinner (prior notice required). Applications should be sent to J. L. Howgego, Esq., B.A., A.L.A., The Library, Guildhall, London EC2, by 4th March 1966. Further details are available from Mr Howgego on request.

Library Advisory Councils

Section two of the Public Libraries and Museums Act, 1964, provided for the establishment of Advisory Councils for England and for Wales and Monmouthshire, to be composed of people with experience of the administration of public and other libraries, who should advise the Secretary of State for Education and

Science on matters connected with the provision or use of library facilities. The following members have now been appointed:

LIBRARY ADVISORY COUNCIL (ENGLAND)

Frank Jessup (*Chairman*)	Secretary, Oxford University Delegacy for Extra-Mural Studies.
D. V. Arnold	Intelligence Section Manager, I.C.I. Heavy Organic Chemicals Division, Billingham.
Mrs W. Bindley	Deputy Chairman, London District of Workers' Educational Association.
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Sir Frank Francis	Director, British Museum.
F. M. Gardner	Borough Librarian, Luton.
H. Goldstone	Member, Manchester City Council.
M. G. Harvey	Member, Malvern Urban District Council.
K. W. Humphreys	Librarian, Birmingham University.
H. A. Jones	Principal, City Literary Institute.
Dr T. Kelly	Director, Department of Extra-Mural Studies, University of Liverpool.
Colonel P. H. Lloyd	Member, Leicestershire County Council
W. R. Maidment	Borough Librarian, Camden.
W. J. Murison	County Librarian, West Riding.
Miss L. V. Paulin	County Librarian, Hertfordshire.
D. T. Richnell	Librarian, Reading University.
B. Sharpe	Member, Lincolnshire (Lindsey) County Council.
F. J. Stott	Member, Plymouth City Council.
W. Tynemouth	City Librarian, Newcastle upon Tyne.
L. Wilson	Director, Aslib.
G. H. Wright	County Technical Librarian, Hertfordshire.

LIBRARY ADVISORY COUNCIL (WALES AND MONMOUTHSHIRE)

Professor R. I. Aaron (*Chairman*)	Professor of Philosophy, University College of Wales, Aberystwyth.
W. Ashworth	Librarian and Information Officer, I.C.I. Fibres Limited, Pontypool.
G. R. Beeston, M.B.E., J.P.	Member, Monmouthshire County Council.
D. Andrew Davies	Secretary, Welsh Joint Education Committee.
Dr Ifor H. Davies, J.P.	Member, Denbighshire County Council.
Alun R. Edwards	Librarian, Cardiganshire and Aberystwyth Joint Library.
T. I. Ellis	Chairman, Regional Library Bureau, Aberystwyth.

Mrs E. C. Gwynn	County Chairman, Montgomeryshire Federation of Women's Institutes.
E. D. Jones, C.B.E.	Librarian, National Library of Wales.
Mrs E. Gwynne Jones	Librarian, University College of North Wales, Bangor.
Mrs T. Jones	Housewife and Secretary of Adult Education Class, Shotton, Flintshire.
Mrs Olwen Parry	Member, Cardiff City Council.
W. J. Philips-Williams	Member, Pembrokeshire County Council.
H. A. Prescott	Borough Librarian, Llanelly.
L. M. Rees	Borough Librarian, Swansea.

Current British Directories

The new edition of *Current British Directories* will shortly be published by CBD Research Ltd, 75 Park Lane, Croydon, Surrey. This, the fifth edition, lists local and specialized directories, directories of Commonwealth countries, and international specialized directories published abroad, and includes a detailed subject index. The price is £4.

Patent Office Publications

Progress report: six months ending 31st December 1965

Specifications: 18,360 were printed and published. All were available on the due date except six which, through a default of the printer concerned, were not published until two days after the due date.

Abridgments

Series 960,001–980,000: five bound volumes were distributed in July and the remaining one in September.

Series 980,001–1,000,000 (the last specification of which was published 28th July 1965): 409 16-page sheets were distributed during the period. This completed the series with the exception of Divisions C6–7. Sixteen of the twenty-five Subject-matter and Names Indexes were distributed in December 1965.

Series 1,000,001–1,025,000 (the last specification of which is expected to be published on 6th April 1966): 132 16-page sheets were distributed during the period, together with nineteen of the twenty-five Classification Key Sections.

Consolidated Name Index (Series 980,001–1,000,000): published on 16th September 1965.

Divisional Allotment Index (Series 980,001–1,000,000): published on 12th August 1965.

The Official Journal (Patents): Twenty-six Journals (Nos. 3986–4011) were published, totalling 2002 pages.

Reports of Patent, Design & Trade Mark Cases: Twelve issues (Nos. 7–18) were published, totalling 404 pages.

Trade Marks Journal: Twenty-six Journals (Vol. 90 Nos. 4532–4557) were published, totalling 865 pages.

International Classification of Goods and Services to which Trade Marks are applied: published on 28th December 1965.

Index to Comparative Periodical Prices

Blackwell's, the Oxford booksellers and periodical agents, are in process of compiling a comparative index to periodical prices for the purpose of assisting librarians in the preparation of their annual budgets. The index is intended to provide annually the percentage increase (never decrease!) in periodical prices, and the average cost of journals within a given subject field. As indexing all titles is not a practical possibility, Blackwell's intend to record annually the price changes of some 2–3000 basic titles embracing all disciplines. To this end they would be very grateful to hear from any librarian, or specialist in any subject, willing to supply them with a list of what he considers the most important titles within his subject field. It is emphasized that although some sixty-eight subjects have been chosen initially, these divisions are by no means rigid and may be amended in the light of the actual pattern of periodical purchase and selection. No restriction on language or country of origin is being imposed as it is hoped that the final lists could act as a guide to new librarians in their periodical selection.

Any librarian willing to compile a subject list should get in touch with Mrs W. I. Veasey, F.L.A., Special Libraries Adviser, B. H. Blackwell Ltd, Broad Street, Oxford, who would also be grateful for any comments or suggestions concerning the project.

Retirement of Mr J. F. Stanley

Mr J. F. Stanley retired from his post as Deputy Technical Director (electrical) of the British Standards Institution at the end of December, after completing forty-three years' service with the Institution. In spite of his many commitments on behalf of BSI, the International Electrotechnical Commission, the Illuminating Engineering Society and many other organizations, he always found time to follow the fortunes of documentation and to give to Aslib the benefit of his clear thinking on any problem put to him.

Many older members of Aslib will have vivid recollections of him at annual conferences where, whether in white tie and tails or school cap and blazer several sizes too small, he gave a dazzling display of conjuring tricks to while away an evening. Others will remember his account, with superb colour slides, of his visit to Moscow at a time when such trips were a rarity, and always his quiet charm and incisive comment at committee meetings and in private discussion. He served Aslib as a member of Council from 1949 to 195[illegible], of the Executive and Finance Committee from 1949 to 1953, and of the International Relations Committee from 1952 to 1964. He takes our very best wishes with him into a retirement which will undoubtedly be as active as his energetic working life.

New Year Honours

We offer our congratulations to Miss V. R. G. Douie, librarian of the Fawcett Society, who has been awarded the O.B.E., and to Miss A. M. C. Khan, librarian of the Ministry of Transport, who has been awarded the M.B.E.

Councillor F. H. ('Nobby') Bell

'Nobby' Bell died suddenly on 27th January 1966. The news came as a shock to his many friends and colleagues. He was well-known in Aslib circles as librarian of Proctor & Gamble Ltd. In public library circles he was, perhaps, better known as Councillor Bell, Chairman of Newcastle upon Tyne Libraries Committee and former Deputy Lord Mayor. His kindness, good-humour, wit and ability were blended in a delightful personality. His death came less than a month before he was to marry, after a long period as a widower, his former Deputy Lady Mayoress, Miss Eleanor Broad.

Miss Florence Milnes

We are sorry to report the death on Tuesday 25th January of Miss Florence Milnes, M.B.E. Miss Milnes was the first librarian of the BBC. During the years from 1925 to her retirement in 1958 (see *Aslib Proceedings* June 1958 p. 157) she built up the Corporation's collections from a single room and a handful of books to a network of five libraries and specialist collections with a stock of some 70,000 volumes and other material.

Miss Milnes was well known to Aslib members as the BBC's representative for many years. Aslib was represented at the funeral by Mr R. L. Collison, the present librarian of the BBC.

PROFESSIONAL STAFF IN INFORMATION WORK—SOME FACTS AND THEIR IMPLICATIONS FOR THE FUTURE

A.P.J.EDWARDS, B.SC., A.K.C., M.I.E.R.E.
Office for Scientific and Technical Information

Paper presented at Aslib Annual Conference, 1st October 1965

History of the National Survey

THE survey which I shall describe was first discussed early in 1964 when the DSIR Information Committee turned its attention to the problem of the training and recruitment of information staff. To this end it set up a working party under the chairmanship of Dr C. J. Smithells to examine the problem in detail. The working party came to the conclusion that the first thing that was needed was a lot more factual information about the present position. So it decided to launch a national survey of staff employed in information work by means of two questionnaires which it drafted, one to be answered by management and the other by individuals. (Perhaps this is a convenient point to mention that the working party defined information work as '. . . all the normal activities of information departments and special libraries engaged in science and technology, but excluding clerical and typing duties, public relations, advertising and sales'; this is the definition of 'information work' used throughout this paper). A pilot survey was then carried out in order to test the questionnaires; participating in this were an information department of a nationalized industry, a research association together with some of its member firms, a DSIR Branch Office which included some firms in the private sector of industry within its area, a DSIR Research Station and the DSIR Headquarters Library. This allowed us to finalize the questionnaires to be used. I should like to thank all those who helped us with the exercise—the chairman and members of the working party and all those who assisted in the pilot survey.

Major changes in the organization of civil science were impending, however, and we felt that little purpose would be achieved by launching the survey before these were complete. One of the results of the rearrangement of responsibilities was the setting up, as from 1st April 1965, of OSTI (Office for Scientific and Technical Information), which included among its functions 'Promoting adequate facilities for training information specialists, including those engaged on research and development'. OSTI was also charged to cover '. . . scientific and technical information over the whole field of the natural and social sciences and their related technologies'. The new Office was thus not subject to the limitations regarding subject fields which the DSIR Act, 1956, had placed on DSIR. So OSTI took on the responsibility for the survey, which was launched in June as soon as the more urgent tasks in setting up the Office had been completed.

It is easy enough to say that the survey was launched, but every launching, whether of a battleship or of a deb on society, involves many headaches. This survey was no exception. We came to the conclusion that about the three most incompatible things in the whole of the information world were the need to *a.* ensure as complete a coverage as possible, *b.* avoid worrying people unnecessarily, and *c.* preserve anonymity. Like FitzGerald, I felt that 'If only I could conspire, to change this sorry scheme of things entire, would I not shatter it to bits and then remould it nearer to the heart's desire'. But the scheme of things, sorry as it might be, was a fact of life to be accepted.

As far as coverage was concerned, we were fortunate in having the co-operation of the research associations and the industrial liaison centres in approaching industry; Government departments were approached direct by OSTI. In addition, a letter from Sir James Cook, the Chairman of the Advisory Committee for Scientific and Technical Information, appeared in the *New Scientist, Nature* and *Chemistry and Industry,* inviting those who had not received copies of the questionnaires to apply to OSTI for them. The editors of *Aslib Proceedings* and the *Library Association Record* kindly agreed to mention the survey in rather similar terms in their respective journals. OSTI also covered the Institute of Information Scientists, the professional scientific and engineering institutions, the libraries of the universities, CATs and regional colleges, and the technical departments of public libraries. I hope you will agree with me that this should have made possible an almost complete coverage. It must necessarily have meant that a number of people were approached more than once; we apologize for this, but it really was unavoidable without having an army of clerks. In these cases we made it clear that one form only was to be completed and returned to us.

Many thousands of forms were distributed, but what about the response? It looks like being very satisfactory, not only in quantity but also in the degree of interest which it has evoked. On behalf of all of us in OSTI I should like to thank all those who have completed questionnaires and returned them to us. We shall go on receiving them until 31st October, since the summer holidays, together with the need for co-ordination in large firms and Government departments, inevitably impose some delays.

Analysis of the first batch of completed questionnaires

All I can report at this stage, therefore, are first impressions from the analysis of 401 completed management questionnaires and 962 forms from individuals; the total will eventually be much larger. I must stress this, since I do not want to mislead you. Certain facts are, however, standing out clearly and are not likely to be all that different (as far as we can see) in the final analysis. I will now deal with those which have a direct relevance to training.

Increase in numbers of information staff

a Full-time

The replies given to the management questionnaire show 747 (305 male, 442 female) people employed full-time in 1960, rising to 1,158 in 1965 (519 male, 639 female) and an estimated 1,496 by 1970—a doubling in ten years.

b Part-time

Similarly the figures for part-time staff are 168 (92 male, 76 female) in 1960, 284 (152 male, 132 female) in 1965, with an estimated 256 in 1970. I shall return to the implications of this later when we look at the overall picture of future demand.

Distribution by economic region

The south-east region employs more staff than any other, numbers rising from 394 full-time in 1960, to 624 in 1965, and an estimated 828 in 1970. Next comes the north-west region with comparable figures of 138, 164 and 175, followed by the west midlands with 83, 114 and 140. The immediate importance of these figures from the point of view of this paper is their relevance when any expansion of training facilities is considered. Obviously there is a lot to be said for running courses where the demand is likely to be greatest.

Distribution by industrial classification

It will come as no surprise to you to learn that chemicals and allied industries employ the greatest number of information staff—202 full-time in 1960, 293 in 1965, with an estimated 434 by 1970. However, since a number of returns from employers of comparatively large numbers of information staff have yet to be processed, it would be unwise to draw too far reaching conclusions from the figures we have obtained to date under this heading.

Distribution by academic achievement and information qualification (if any)

a University degree

We now come to the analysis of the 962 questionnaires which individuals have completed and returned to us. Of these individuals, 259 are graduates in science or engineering (116 holding at least a second-class honours degree) and 100 are graduates in arts subjects (59 holding at least a similar class of degree). In other words, just over a quarter of the total number of staff we are considering have a science or engineering degree of some sort. I expect you feel that, even though this percentage could be better, it could also be much worse. But if you look at the situation more closely, i.e. to discover how many hold a science or engineering degree *plus* an information qualification, the picture is rather different. Of the 116 I have mentioned holding at least a second-class honours degree, one has Library Association qualifications, 25 have membership of the Institute of Information Scientists, and 90 have no formal qualification at all. Comparable figures for the remaining 144 science/engineering graduates are 7, 34 and 103. Even when we look at all 259 graduates, can we regard 8 with Library Association training, together with 59 with membership of the Institute, as the desirable proportion of fully qualified staff among the 962 we are talking about?—it amounts to less than 7 per cent. I wonder if any other profession would be satisfied with so low a percentage. For the sake of completeness you may like to know that less than one-third of the 100 arts graduates have a formal information qualification.

b Membership of scientific or professional engineering institutions, or holders of HND/HNC

Ten members of a professional institution (excluding holders of degrees) have a Library Association qualification and 30 are members of the Institute; 112 have no qualification. Comparable figures for holders of HND/HNC are 2, 6 and 12. Again, is the proportion right?

c Others

Less than half (137 out of 296) have any formal qualification.

Short courses and part-time training

Here, without doubt, Aslib has made a useful contribution, and I for one would like to pay tribute to its efforts over the years. In this survey, 209 people (including 50 science graduates and 17 members of professional scientific institutions) have taken Aslib courses, compared with 102 who have taken other short courses. Seventy have taken day release courses and 211 evening courses.

Training of staff in post

Management were asked to comment on their attitude to day release courses, sandwich courses and full-time courses in so far as their own staff in post were concerned. Three hundred were prepared to support day release courses and 14 were against; 148 were in favour of sandwich courses and 103 against; 103 would support full-time courses and 149 would not. Obviously training must to some extent be tailored to meet the needs of employers, and here I find this overwhelming expression of support for day release courses of great significance, particularly as it applies to all levels of staff, from graduates needing some formal training and qualification to the clerical staff who need some training in their duties and their environment. From the fairly considerable number who have given us their views on this point, I would say that an increase in the numbers of short courses of the type run by Aslib would also be welcomed and would help to satisfy a great need.

Estimates of future demand

I have shown earlier in this paper that management questionnaires returned to us in respect of 401 firms and organizations show that their full-time information staff is expected to grow from 747 in 1960 to an estimated 1,496 in 1970. Using indicators such as Aslib membership, I suggest that a cautious and, I hope, not too conservative guess might give a total of some 3,500 people engaged full-time in information work by the time we have received and analysed all the forms at the end of the exercise. If the rate of increase indicated by the forms already received remains about the same, this means roughly five thousand in post by 1970.

In addition we must bear in mind that the number of present staff who are over 60 and who will therefore retire by 1970 is of the order of 100. One must also not forget that there are other forms of wastage in so far as the profession is concerned, of which marriage must be an important one since more women are employed in it than men. A total figure of 250 to cover retirement and wastage would not seem unreasonable. The total might in fact be much higher if turnover at the lower levels were included, but I think most staff of this level would be excluded by our definition of 'information work'.

By adding together all the components we find that 1,750 additional staff may be needed by 1970. The crucial question is: where are they to come from, what training should they have, and who is to provide that training?

Let us examine the graduate position first. It seems to me that all the future heads of all the larger special libraries and information departments should be science or engineering graduates with formal training in information work, as should teachers in the subject. To this we must add the research workers and the need of larger libraries and information departments for more than one trained graduate. I expect you can think of other positions where graduates would be needed. Would 25 per cent. of the increase of 1,750 be of the right order for this purpose? This amounts to about 450 people. In other words, the postgraduate schools such as those at Sheffield University and the Northampton CAT would need between them to train nearly 150 graduates a year over the three years 1967–70 if the country's needs are to be met.

But this still leaves the other 75 per cent.—1,300 in terms of numbers of people. What is their training to consist of? And at what level should it be? This is a subject for a day's discussion in its own right so I trust you will excuse me if I say only a few general words about it now, in the light of what the survey has produced so far. I have already mentioned the overwhelming support which management is prepared to give for day release training. Does this suggest that information work might become an endorsement subject, or even the main subject, for the HNC and HND, or perhaps that we shall see the science option of the ALA, perhaps in a modified form, being taken on a part-time basis? Then the courses in librarianship which certain colleges are devising for the Council for National Academic Awards as suitable for a first degree should, provided the scientific and technical content of the syllabus is adequate, go some way at least towards meeting the requirement I have referred to concerning sandwich courses. I also hear whispered that the possibility of a Library Assistant's Certificate is being discussed.

The need for teachers

Now let us come down to earth again. Without the teachers the expansion of educational facilities is largely a pipe-dream. In my view the need to provide an adequate supply of properly trained teachers is the most urgent problem facing us, and for its solution we are to a great extent dependent on the postgraduate schools. From talks I have had with those responsible for education in universities and colleges, all the indications are that the present supply is very meagre. What can be done about it, particularly by those of us who are here today? The immediate answer is to make an all-out effort to attract far more of the better science graduates into information work, either the newly fledged or those who wish to make a change after a period of other scientific activity. Since this is so important, I would like to tell you now something about the different forms of Government support which are available for postgraduate and postdoctoral training.

Both the full-time postgraduate course in information science at the Northampton CAT and the science option of the course in the postgraduate library school at Sheffield University were accepted by DSIR for the tenure of its advanced course studentships, a responsibility now taken over by the Science Research Council. We would hope that other postgraduate courses which might be run in other suitable areas, e.g. that planned at University College London, would receive similar recognition and encouragement. The minimum academic qualification for an advanced course studentship is a lower second-class honours degree in science or technology, or an acceptable alternative. For students living in hostel, college or lodgings the minimum value of an SRC studentship is £500 per annum; students aged 23, 24, 25, 26 and 27 years or more and who have postgraduate industrial experience can receive allowances of £100, £125, £150, £175 and £200 per annum respectively; there are allowances of up to £100 per annum for older students; extra money is provided for fares, field work, and essential visits and conferences; generous allowances are made for money received from teaching; dependants' allowances are available in certain circumstances; fees are paid. Thus, for example, a married man of 25 with no children and with two years' postgraduate experience would receive, in all probability, at least £825 per annum—and all this tax free.

This is also a convenient place to mention SRC research studentships; these have the same value as the advanced course studentships, but are awarded to allow the holder to be trained in methods of research. From this source, if it existed, should come our university teachers and research workers. Unfortunately, as far as OSTI can judge, not one scientist has received training in a scientific documentation topic leading to a Ph.D.; perhaps, however, the tide is beginning to turn, in that one such student is taking up an award this academic year at the University of Newcastle for this purpose. We would hope that university departments in such disciplines as the natural sciences, mathematics and engineering would consider urgently having one or two research students with a research topic involving research techniques of the parent department, but also embracing some aspect of scientific documentation.

Then there are SRC research fellowships for young research workers who have completed the normal course of postgraduate research training. These have a value of from £950 to £1,175 per annum, rising, exceptionally, to £1,325 per annum. Finally, I should mention the new industrial fellowships which are designed for men who have had valuable experience in industry, who are older than normal candidates for studentships and who intend to return to work in industry on completion of their fellowships. These awards are to enable industrial scientists and technologists to obtain further training in the methods of research or to go on suitable courses of instruction usually below postdoctoral level. Their value is up to £2,000 per annum, with the expectation that part of the cost will be met by the industrial fellow's firm.

I would ask every one of you to make these opportunities known to any suitable graduates you come across. Details of SRC awards are available in universities and colleges. OSTI will always do its best to advise in general or on a particular case.

Conclusions

To avoid any possible misunderstanding, I should like to repeat that the survey is not complete and that the figures given in this paper are therefore not the final ones and should not be quoted as gospel truth. Further, I expect some of you might question the way we went about the exercise, in some respects at least. And, of course, any views expressed in this paper are mine and not necessarily those of OSTI.

I can best sum up the replies from the analysis to date by saying that all the indications are that both management and individuals are becoming increasingly aware of the need for training in information work; that the present provisions are far from satisfactory; and that improvements would be welcomed, particularly if integrated with the needs of industry. This, surely, is an admirable basis on which to build.

More specifically, among the possibilities which need closer study are *a.* the attraction of many more good science and engineering graduates into the profession; *b.* the training of an adequate number of these graduates in the postgraduate schools, particularly those who will become teachers and those who may become heads of information departments and special libraries; *c.* an integrated plan for training an adequate number of staff at all levels, particularly with regard to (*i*) day release courses, (*ii*) short courses, (*iii*) sandwich courses, and (*iv*) full-time courses; and *d.* better publicity for Government support of training, particularly at the postgraduate and postdoctoral level.

Should Aslib wish to, I am sure it could play a great part in helping to satisfy the need, which the survey has shown to exist, for a considerable expansion in the provision of short, specialized courses. It certainly has the experience and the standing to do so.

Finally, may I thank you all for listening to me today within the walls of this university which is so well known for radical experiments in education which have contributed much to the basis of the pattern of training in our new universities. I only hope that the stimulus to educational work which OSTI is endeavouring to undertake, a part of which I have been privileged to address you on today, will also provide a basis for education and training for information work in the United Kingdom which will benefit ourselves and our country.

DISCUSSION

Mr J. S. Rippon (Metal Box Co.) asked what incentive there was for information staff to gain professional qualifications when the Civil Service salary scales depended solely on the class of degree held, and information qualifications were not taken into account. Since industry was now tending to base its salaries on Civil Service scales, graduates in industrial information units might not benefit financially from becoming qualified either. In fact, if more regard were not paid to professional qualifications it was just possible that some practising information workers might find it profitable to apply for OSTI Research Fellowships, and this would then become another source of wastage from the profession.

Mr Edwards said that he had not gone into this aspect in his survey.

Mr C. W. Hanson (Aslib Research Department) said that the Institute of Information Scientists had made a survey of the salaries of its members and that this would be published shortly.

Mr Farradane said that research was essential for teaching; it showed students the liveliness of their subjects, and furnished material for higher degree work.

Dr M. F. Lynch (Postgraduate School of Librarianship, Sheffield) welcomed OSTI's initiative in making the Survey, and the contribution it made to replacing intuition and rule-of-thumb reckoning by hard facts and figures. Since the figures for 1970 were based on management's estimates, and since any number of curves could be drawn through two points, had OSTI considered making depth studies of selected information centres to determine the shape of the curve during the last few years? OSTI's main concern was for scientific and technical information centres; the science students leaving the Sheffield School in 1965 went, in the main, to university libraries, largely because of the initial salaries offered and because definite scales and prospects were available, in distinct contrast to normal industrial practice.

Mr Edwards said that this would be good for university libraries. He would like to do more detailed studies, but he was anxious to get results that would provoke quick action.

Mr K. Davison (Birmingham School of Librarianship) said that, of the people attending the present Aslib Conference, ninety-eight had professional Library Association qualifications and thirty-seven had those of the Institute of Information Scientists. They should not discourage the present major source of recruitment to the profession. There was a need for graduates, but the contribution of professional education should not be ignored.

Mr D. V. Arnold (ICI Heavy Organic Chemicals Division) pointed out that such deductions could be dangerous, since not all professional qualifications were shown on the attendance list.

Mr F. Liebesny (British Aluminium Co.) said that the Aslib Education Committee was about to set up a working group on the provision of suitable teachers for the proposed CNAA courses.

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Volume 18 **March 1966** **Number 3**

ASLIB CALENDAR 1966

March

TUE.22.	Midlands Branch annual general meeting, Birmingham.
WED.23.	Northern Branch annual general meeting. Sheffield University.
FRI.25.	Biological Group Meeting. Scottish Branch annual general meeting, East Kilbride.
FRI.25 – SUN.27.	Aeronautical Group 15th Annual Conference, College of Aeronautics, Cranfield.
TUE.29 – FRI.1.	Junior Introductory Course.

April

THUR.21.	Evening meeting at Aslib. 5 for 5.30 p.m. 'University libraries and the information needs of the research worker', by Dr J. L. Dolby and M. B. Line.
SAT.23 – SUN.24.	Engineering Group conference, Leamington Spa. 'Standards, standardization and standards engineering.'

May

THUR.5 – SAT.7.	Midland and Northern Branches. Joint conference at Llandudno.
WED.18.	Electronics Group visit to Signals Research and Development Establishment.
TUE.24.	Evening meeting at Aslib, 5 for 5.30 p.m. 'The information services of the U.K. scientific in Washington', by Harry K. Bourne.

June

TUE.14.	Evening meeting at Aslib. 5 for 5.30 p.m. 'The background to presentation of BBC news on TV and radio', by Geoffrey Hollingworth.
FRI.24 – SUN.26.	Electronics Group 8th annual conference, Ashridge College, Berkhamsted.

September

SUN.25 – WED.28.	40th Annual Conference at Scheveningen (The Hague).

Physics Abstracts: Aslib work for the IEE

Aslib is playing a major part in the ambitious project of the Institution of Electrical Engineers to mechanize *Physics Abstracts* services, references to which readers may have read in the general Press (e.g. 'Information for the physicist', by Anthony Tucker, *The Guardian,* 8th February 1966). Starting with a pilot project covering the literature of plasma physics on which active work is now in progress, the total plan incorporates proposals for the production of the whole of the material for *Physics Abstracts* in machine-readable form, and the use of this not only to produce *Physics Abstracts* via computer control and photocomposition, but also to provide indexes, current awareness journals, bibliographies, machine retrieval searches, data compilations, etc.

Aslib is working under contract with the IEE on this project, which is likely to continue for some years. From the start in May 1965, two members of the research staff, Mr East and Mr Weyman, have been giving most of their time to it.

A third member of the research staff, Mrs Slater, is currently conducting an investigation, also under contract with the IEE, into readers' reactions to the new journal *Current Papers in Physics.*

IBM 870 at Aslib

Aslib has recently installed an IBM 870 Document Writing System in the headquarters building at 3 Belgrave Square. The IBM 870 is a versatile system which can read from 80-column punched cards, from 8-channel paper tape or from the card-punch keyboard, and produce either 80-column punched cards or typewritten documents. Latch and format selectors serve as simple memory devices. All internal wiring is brought to a plugboard (or control panel) which can be wired to control the format of documents to be produced, to rearrange, insert or delete parts of processed documents, to distinguish between several kinds of documents, or to produce multiple documents.

The system will be used mainly for research and educational purposes.

Photocopy Service

A Rank Xerox 914 electrostatic copier has recently been installed at Aslib headquarters. Requests to the library may in future be answered with a copy rather than the original, in cases where the original may not be lent or where it is cheaper to send a copy. In this connection a requisition form for library loans has been designed and is available to members in book form. It will greatly help the library if these forms are used; they can be obtained from the Librarian, Aslib, 3 Belgrave Square, London SW1.

Aslib Economics Group

The annual general meeting and luncheon will be held this year on Tuesday 29th March at the Criterion Restaurant, Piccadilly Circus, beginning at 12 o'clock.

Members attending the National Central Library meeting, also on 29th March, should note that this will now begin at 3 p.m.

Aslib Electronics Group

A *List of recently coined terms in electronics for librarians and information officers in electrical and electronic engineering,* compiled by Ellen M. Codlin and C. K. Moore, has just been published by the Aslib Electronics Group. This supersedes the edition of June 1963, and contains ninety additional terms and some amendments. The list may be obtained, price 7*s* 6*d* (5*s* to members of Aslib), from Miss B. Newman, Plessey Telecommunications Group, Ericssons Telephones Ltd, Beeston, Nottingham. Cheques should be made payable to Aslib Electronics Group.

Deutsche Bibliographie

A number of changes have been introduced in the German national bibliography since January. The most significant is that it is now produced by computer-aided typesetting.

During 1965 the Zentralstelle für Maschinelle Dokumentation in collaboration with the Deutsche Bibliothek in Frankfurt am Main solved the main filing, coding and machine problems. The input is by tape typewriter, and the material is transferred to magnetic tape using the IBM 7765. The references are then handled in an IBM 1460 computer (installed at the Zentralstelle last October) and an output tape is produced for composition on a Linotype machine in 8 point Times Roman. The Germans can thus produce their weekly bibliography without forgoing typographical quality, and can speed up the appearance of the monthly, quarterly and other cumulated indexes.

This pioneering achievement is a tribute to the initiative and co-operation of these two organizations, which had to overcome many technical difficulties.

BACIE Register of Programmed Instruction

The *Register* was compiled to meet the demand for centralized information on teaching programmes related to industrial and commercial training. It lists both programmes produced commercially by publishers and teaching machine manufacturers and those written within individual firms and colleges. Information for each programme covers such details as content, format, availability, target population, average study time, publisher and price. Only programmes available in the United Kingdom have been included and no attempt has been made to evaluate the effectiveness of the programmes listed.

This information was first published as supplements to the June and September 1965 issues of the *BACIE Journal* and is now reprinted in a single volume with some additional material and a subject index. It is hoped that supplementary volumes will be produced from time to time. The *BACIE Register of Programmed Instruction,* Vol. 1, is available from the BACIE Publications Department, price 17*s* 6*d* to members of the Association, 25*s* to non-members.

British Research and Development Reports

The National Lending Library for Science and Technology has just issued the first number of *British Research and Development Reports,* which is described as an attempt to widen the distribution of report literature produced in Great Britain.

This issue contains details of 101 reports, broadly classified, and is distributed mainly to NLL borrowers.

The NLL is anxious to collect British reports and would welcome any information on sources, particularly of reports which are not normally published.

Documentation of Documentation

On behalf of the Classification Research Group and with the financial support of Aslib, Mr E. J. Coates, editor of the *British Technology Index*, attended the Working Party on 'Documentation of documentation' held in Marseilles from 1st to 3rd December 1965. The object of the meeting was to formulate the first steps to be taken in the compilation of a 'basic lexicon' of the fundamental concepts which might be expected to appear in a classification or descriptor list covering the field of documentation. Such a basic lexicon would serve as a conversion tool whereby groups of terms in one classification or descriptor list could be equated with their conceptual equivalents in another classification or list. It is hoped that the final draft will be completed by October 1966, and that copies will be made in French, English, German and Russian.

Patents course

The sixth annual patents course at the School of Librarianship, Liverpool College of Commerce, aims to cover in detail the searching procedures and techniques which are needed by scientists, information officers and technical librarians who are concerned with patents, the functions of the chartered patent agent, and the use of patents as sources of information. The course will be held from 20th to 22nd April 1966. The fee is £3. Further details may be obtained from the School of Librarianship, College of Commerce, Tithebarn Street, Liverpool 2.

Slavonic languages course at Birmingham

A short intensive course in Slavonic languages for graduates with a knowledge of Russian will be held at the University of Birmingham from 4th to 17th September 1966, with the aim of helping them to read social science literature in a second Slavonic language. The languages offered will be Czech, Polish and Serbo-Croatian; Bulgarian may be added if there is sufficient demand. While the emphasis will be on reading, a language laboratory will be available and there will be some background lectures on Comecon countries.

Fees will be £27 for residents, £7 for non-residents. Enrolments should reach The Secretary, Centre for Russian and East European Studies, The University, Birmingham 15, by 30th May.

Patent Office move

It was announced in *Hansard* on 10th February that the Patent Office will be moved to a suitable site in Croydon. The Library will, however, remain in central London and the Printing and Sales Branch at St Mary Cray.

NEW MEMBERS

CORPORATE

Name	*Locality*	*Representative*
Anson, George, & Co. Ltd	London	P. S. Johnson
Calico Printers' Association Ltd	Lancashire	P. W. Ashton
Centro de Investigacion Documentaria	Argentina	Mrs E. B. Bachofen de Mastorino
Colquhoun, Brian, & Partners	London	O. C. A. Hankey
FMT Editorial & Writing Services Ltd	London	Mrs V. West
Hellenic Industrial Development Bank	Greece	
Horlicks Ltd	Buckinghamshire	M. D. Simmonds
InterDok Corporation	U.S.A.	B. B. Baschkin
Intinco Ltd	London	C. J. Austin-Billinghurst
Knight, Austin, Ltd	London	L. J. Marchant
Kollsman Instrument Ltd	Hampshire	R. F. Davey
Little, Arthur D., Ltd	London	Mrs V. Sladek
London Graduate School of Business Studies, The	London	K. D. C. Vernon
McKechnie Chemicals Ltd	Lancashire	Mrs J. R. Hoines
Maclaren & Sons Ltd	London	N. C. Hammerton
Merck Sharp & Dohme Ltd	Hertfordshire	Dr W. G. Thomas
Ministry of Defence (Library Matachim)	Israel	G. Shavit
National Library of Nigeria	Nigeria	Miss A. P. Taylor
Novadel Ltd	Kent	Dr P. Halewood
Porous Plastics Ltd	Essex	K. G. Wyness
Societas Bibliographica	Switzerland	
Stockport College for Further Education	Cheshire	K. Blakeman
Syntex Pharmaceuticals Ltd	Berkshire	Mrs R. Gillham
Technical Indexes Ltd	Berkshire	K. Trench
Unilever Research Laboratory	Germany	Dr A. Thomas
Union of Post Office Workers	London	J. Matthew
Vacuum Metallurgical Developments Ltd	Lancashire	K. A. Johnson

INDIVIDUALS

Name	*Locality*
Bailey, J. L.	Leicestershire
Carley, A. B.	Surrey
Clark, Miss M. E.	London
Huggard, Miss E.	Essex
Peacock, Miss M. S.	Oxfordshire
Salton, G.	U.S.A.
Wahba, Miss C.	London
Woledge, G.	Middlesex
Woodhead, Miss E.	Yorkshire

DOCUMENTATION OF DOCUMENTATION

A survey of leading abstracts services in documentation and an identification of key journals

ALAN GILCHRIST, A.L.A.
Aslib Research Department

Five leading abstracts services in the field of documentation were inspected. A measure of their coverage was obtained by matching the items of a bibliography against each service. All abstracts published by these services in 1964 were counted and ranked to estimate the scope of each service, to identify key journals and to assess the language problem. Leading journals were also identified by counts of citations following articles in nine leading documentation journals, mostly over a five-year period. These citations were ranked in the same way as the abstracts in order to further identify key journals and to provide another view of the language barrier.

AUTHOR

IMPORTANT advances made in recent years in the abstracting of scientific and technical journals, largely through the energies of documentalists, together with a dissatisfaction with present abstracts services covering library literature have prompted a look at the documentation of documentation itself. First of all it must be said that few would attempt to define the term documentation, or library science, young as these subjects are. It can be said, though, that there is little science involved in the subject, so that the literature of documentation does not behave in quite the same way as does that for example of chemistry. However, it is valuable to look at the abstracting services in the field of documentation and this is yet another paper to demonstrate the truth of documentation's only law, Bradford's Law of Scatter.

ABSTRACTS

Services studied

In a recent article Whatley[1] lists twenty-one abstracting services. Of these, six are in English (two have died since his article appeared); eleven are publications from the Soviet bloc; nine are separate publications devoted entirely to abstracting or indexing (one G.B., one U.S., one Italian and six Soviet bloc, including two card services). In the present study six services were examined:

American Documentation: published in January, April, July and October by the American Documentation Institute. Contains an abstracts section called 'Literature Notes' consisting partly of titles only (about a third), partly of author abstracts and partly of prepared abstracts of books, reports and journal articles. These are arranged under broad subject headings, each entry number indicating year and issue. Each issue contains its own author index. From January 1965 'Literature Notes' has been alternatively available as a separate.

Library Science Abstracts: published in June, September, December and March by the Library Association. Contains abstracts of journal articles, books and reports continuously numbered and arranged under subject headings. In 1965, 206 journal titles were covered. An author index and a detailed subject index are issued with the fourth part in March. There have been, so far, two cumulations; volumes 1–6 and 7–11.

Nachrichten für Dokumentation: published in March, June, September and December, by the Deutsche Gesellschaft für Dokumentation, Frankfurt. Contains an abstracts and titles section titled Bibliographie, in three parts. The first part, Bücherschau, contains a few abstracts of books and reports; the second part, Referatedienst, Dokumentation und Information, contains a few abstracts of journal articles; the bulk is titles, some annotated, in the third part entitled Zeitschriftenschau. All these entries are arranged by UDC under broad subject headings. No author index, subject index or cumulations.

Referativnyi Zhurnal – 59. *Nauchnaya i Tekhnicheskaya Informatsiya:* published six times a year by VINITI. In Russian, but English translations prepared in Russia are expected to appear soon. Abstracts of books, reports and journal articles appear in UDC order under broad subject headings. There is an annual author and subject index, the author index appearing in both cyrillic and roman alphabet.

Revue Internationale de la Documentation: published in February, May, August and November by the Federation Internationale de la Documentation. This, sadly, ceased publication with its last issue in 1965. Included a section giving titles (some annotated) called Bibliographia. Covered mainly journal articles, arranged by UDC under broad subject headings. No author index, subject index or cumulations.

Included in the first part of this study but not in the rest:

Library Literature: published in March, June, September and December by the H. W. Wilson Co. of America. This is an indexing service covering 166 journal titles in 1965, with books and reports and certain items from other Wilson periodical indexes. Items are arranged in dictionary catalogue manner and are cumulated every year and every three years.

Coverage

The first part of this study used the technique devised by Martyn and Slater[2] in their tests on abstracts journals. This technique is to search the author indexes (where possible) of abstracts services for each item in the bibliography to determine the coverage afforded by the services. The bibliography used in the present test was: 'Tentative bibliography on evaluation of information systems' compiled by Madeline M. Henderson at the National Bureau of Standards Research Information Center and Advisory Service on Information Processing, dated 18th February 1965. The first sixty-nine titles only were used, these being in a section considered more certain than tentative. Of the sixty-nine items there were

53 U.S. (20 from *Amer. Doc.*)
11 G.B.
3 International
1 Sweden
1 India
—
69

30 Journal references
5 Reviews in journals
1 Letter in a journal
25 Books or pamphlets
5 Conference proceedings
2 Government reports
1 Thesis
—
69

Because *Referativnyi Zhurnal* did not start until 1963, any reference with a date earlier than the earliest of the sixty-nine to be abstracted by this service was ignored. This cut the bibliography to thirty-nine (twenty-two journals) for *Referativnyi Zhurnal*. The earliest reference, *Unesco Bulletin for Libraries*, November–December 1958 was abstracted by all the services (except *Referativnyi Zhurnal*). The latest reference, a case study published by Herner and Company in September 1964, did not appear in any of the five services. *Library Science Abstracts*, *Library Literature* and *Nachrichten für Dokumentation* were searched to the March 1965 issues, *American Documentation* to the April 1965 issue, and *Referativnyi Zhurnal* to the third of its six issues in 1965. The results can be seen in tables 1 and 2. If journal items only are selected from this bibliography all five services had better performance figures. *American Documentation* stayed at the top of the list, tying with *Library Literature*, citing twenty-six of the thirty-six items, or 72 per cent. They were followed by *Nachrichten für Dokumentation* with twenty-four, or 67 per cent, *Referativnyi Zhurnal* with fourteen out of a possible twenty-two items, or 64 per cent, *Revue Internationale de la Documentation* with eighteen, or 50 per cent, and *Library Science Abstracts* with seven, or 19 per cent.

Because the bibliography chosen for this study was American and contained twenty items from *American Documentation* itself it might have been expected that *American Documentation* would come top. For a fairer picture, the bibliography on co-ordinate indexing used in the Martyn and Slater study[2] was checked against *American Documentation*. This bibliography was: 'Co-ordinate Indexing: a bibliography based on material in the Aslib Library in 1962' by P. L. Erskine and contained in *Aslib Proceedings* vol. 15, no. 2, February 1963. Of the 186 items, fifty-seven, or 31 per cent, were found in *American Documentation*. However, *American Documentation* has only recently adopted the practice of including its own articles in its abstracts section. If the items from the bibliography that appeared in *American Documentation* are added to the coverage figure it rises to 103 out of 186 or 55 per cent, compared with 60 per cent in *Library Literature* and 30 per cent in *Library Science Abstracts*.

Publication delay

Figures for the delay time between the publication of the original and the appearance of the abstract (table 3) were found by comparing the accession dates in the Aslib library of the original publication and of the abstract. The first column is included as some guide to the accuracy of the figures in the second column. These figures do not vary greatly from those found earlier by Buntrock[3] except for *Library Science Abstracts,* which on the evidence of this small sample appears to be slower.

TABLE 1. ***Coverage and multiple coverage of the items in the bibliography by the six abstracts services***

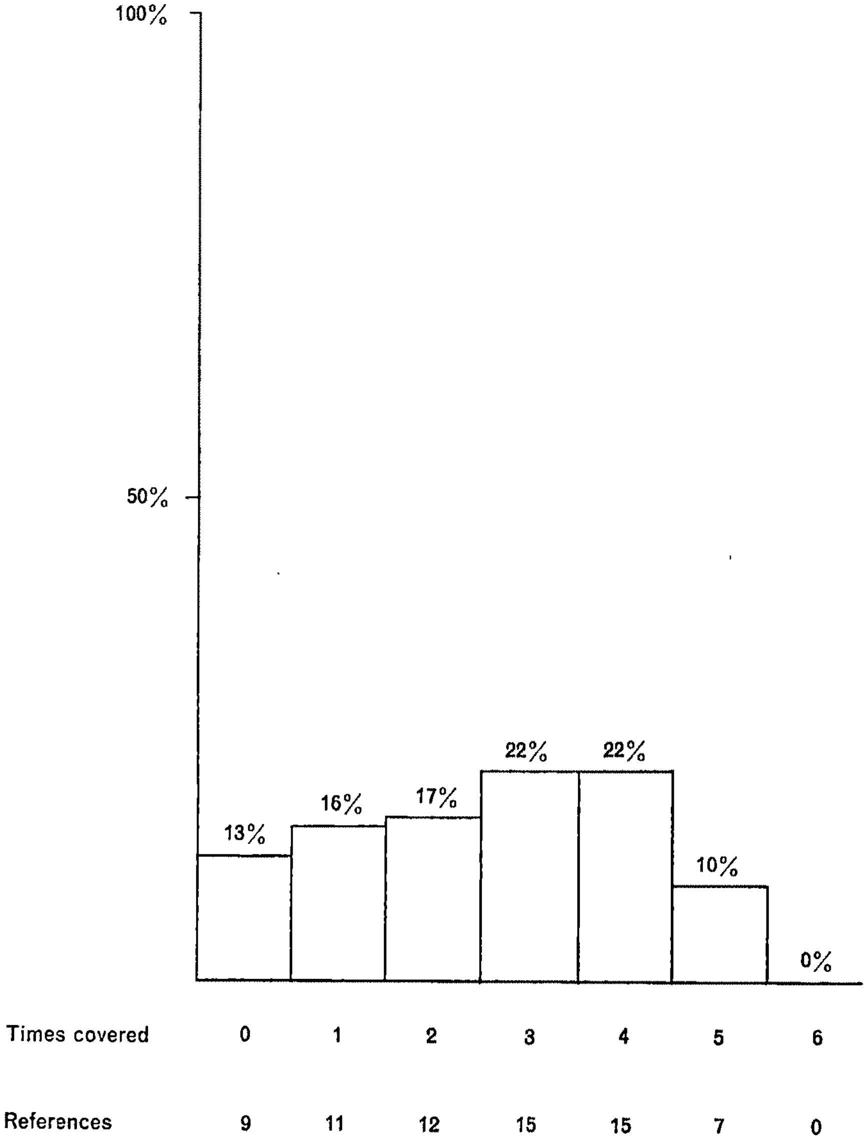
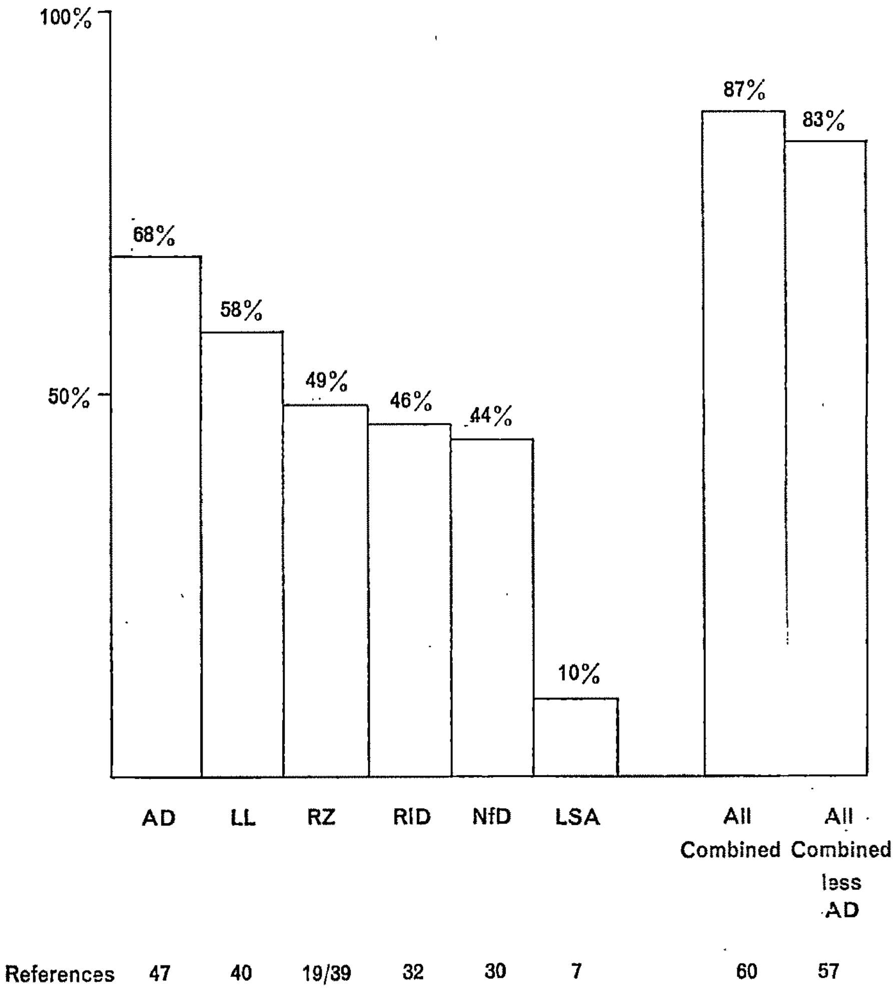


TABLE 2. *Coverage of items in the bibliography by the individual abstracts journals*



AD	*American Documentation*
LL	*Library Literature*
RZ	*Referativnyi Zhurnal*
RID	*Revue Internationale de la Documentation*
NfD	*Nachrichten für Dokumentation*
LSA	*Library Science Abstracts*

TABLE 3. ***Time lag between publication of originals and of abstracts***

		Number of Abstracts	Average delay in days	Maximum (days)	Minimum (days)
Amer. Doc.	(Q)	30	281	707	111
Lib. Sci. Abs.	(Q)	6	239	346	139
Lib. Lit.	(Q)	6	213	433	96
Nach. f. Dok.	(Q)	23	168	454	64
Ref. Zhurnal	(6 p.a.)	16	342	640	173
Rev. Int. Doc.	(Q)	20	332	862	109

Scope

The citations in the five abstracts services appearing in 1964 were counted and analysed and have been ranked in descending order of frequency of citation in table 4.

TABLE 4. ***Journal titles cited most frequently by five abstracts services***

American Documentation 281 abstracts from 88 titles (+456 books, reports, etc.)

J. Chem. Doc.	47
Spec. Libs.	20
Amer. Doc.	19
Rev. Int. Doc.	11
Lib. Resources	10
Aslib Proc.	8
J. Doc.	
Nat. Micro-News	7
Inf. Stor. Ret.	
Lib. J.	6
J.ACM	

and 4 titles with 5 citations each
6 " " 4 " "
5 " " 3 " "
11 " " 2 " "
51 " " 1 " "

Library Science Abstracts 1,003 abstracts from 152 titles (+92 books, reports, etc.)

Coll. Res. Libs.	57
Lib. Assn. Rec.	56
Lib. Resources	49
Lib. J.	32
Lib. World	30
Wilson Lib. Bull.	29
Bull. Med. Lib. Assn.	27
Amer. Arch.	21
Kirjastolehti	19
N.Z. Libs.	

and 3 titles with 18 citations each
2 " " 17 " "
1 " " 16 " "
1 " " 15 " "
1 " " 14 " "
2 " " 13 " "
4 " " 12 " "
3 " " 11 " "
4 " " 10 " "
3 " " 9 " "
8 " " 8 " "
9 " " 7 " "
7 " " 6 " "
10 " " 5 " "
5 " " 4 " "
9 " " 3 " "
21 " " 2 " "
49 " " 1 " "

Nachrichten für Dokumentation 589 abstracts from 170 titles (+4 books, reports, etc.)

Spec. Libs.	43
Tud. Müsz. Tájék	24
Amer. Doc.	21
Nauchno-tekhn. Inf.	20
Dok.	19
Rev. Int. Doc.	
Akt. Prob. Dok. Inf.	17
J. Chem. Doc.	
Aslib Proc.	14
Unesco Bull.	
Met. Techn. Inf.	

and 2 titles with 13 citations each
2 ,, ,, 11 ,, ,,
3 ,, ,, 10 ,, ,,
2 ,, ,, 9 ,, ,,
2 ,, ,, 8 ,, ,,
3 ,, ,, 7 ,, ,,
3 ,, ,, 6 ,, ,,
8 ,, ,, 4 ,, ,,
13 ,, ,, 3 ,, ,,
24 ,, ,, 2 ,, ,,
97 ,, ,, 1 ,, ,,

Referativnyi Zhurnal 2,538 abstracts from 522 titles (+492 book reports, etc.)

Nauchno-tekhn. Inf.	164
Reprog.	95
Sov. Bibliog.	63
Nat. Micro-News	62
Met. Techn. Inf.	58
Tekhn. Bib-ki. SSSR	55
J. Chem. Doc.	43
Bull. Bib. France	
Off. Mach. Guide	39
Spec. Libs.	37
Office	
Lib. Resources	34
Tud. Müsz. Tájék.	
Rev. Int. Doc.	32
Unesco Bull.	
J.I.C.S.T.	31
Buro. Org.	
Bull. Med. Lib. Assn.	29
Akt. Prob. Dok. Inf.	
Dok.	26
Bull. A.I.D.	
Amer. Doc.	25
Lib. J.	24
Off. Mag.	22
Data Proc.	
Org. Met. Techn.	20

and 2 titles with 19 citations each
2 ,, ,, 18 ,, ,,
4 ,, ,, 17 ,, ,,
7 ,, ,, 15 ,, ,,
2 ,, ,, 14 ,, ,,
2 ,, ,, 13 ,, ,,
3 ,, ,, 12 ,, ,,
6 ,, ,, 11 ,, ,,
4 ,, ,, 10 ,, ,,
7 ,, ,, 9 ,, ,,
6 ,, ,, 8 ,, ,,
10 ,, ,, 7 ,, ,,
6 ,, ,, 6 ,, ,,
19 ,, ,, 5 ,, ,,
33 ,, ,, 4 ,, ,,
40 ,, ,, 3 ,, ,,
75 ,, ,, 2 ,, ,,
268 ,, ,, 1 ,, ,,

Revue Internationale de la Documentation 634 abstracts from 151 titles

Nauchno-tekhn. Inf.	127
Tekhn. Bib-ki. SSSR	46
Akt. Prob. Dok. Inf.	39
Met. Techn. Inf.	
Sov. Bibliog.	32
J. Chem. Doc.	23
J.I.C.S.T.	22
Tud. Müsz. Tájék.	20
Techn. Knihovna	19
Amer. Doc.	12

and 1 title with 11 citations each
1 ,, ,, 9 ,, ,,
1 ,, ,, 8 ,, ,,
2 ,, ,, 7 ,, ,,
3 ,, ,, 6 ,, ,,
3 ,, ,, 5 ,, ,,
6 ,, ,, 4 ,, ,,
7 ,, ,, 3 ,, ,,
18 ,, ,, 2 ,, ,,
99 ,, ,, 1 ,, ,,

TABLE 5. ***Contributions of most frequently cited titles***

	Amer. Doc.	*Lib. Sci. Abs.*	*Nach. f. Dok.*	*Ref. Zhurnal*	*Rev. Int. Doc.*
Total number of citations	281	1003	589	2538	634
Total number of journal titles cited	88	151	169	522	151
% of total citations provided by 5 titles	38	22	22	17	45
% of total citations provided by 10 titles	51	34	35	26	60
Number of titles providing about 50% of total citations	10	20	18	35	7

Bradford's Law of Scatter and the huge tail of comparatively unproductive journals can be appreciated from tables 4 and 5. It can also be seen from looking at the titles most frequently abstracted by these services what sort of coverage has been aimed at. *American Documentation* of all the services is the one that shows the subject of library science becoming more scientific: The *Journal of Chemical Documentation* appears at the top of the list, the *Journal of the Association for Computing Machinery* in eighth place and further down the list the IBM *Journal of Research and Development* was cited five times and *Communications of the Association for Computing Machinery* four times. The *Library Science Abstracts* list reflects, not unsurprisingly, a strong bias towards public library matters; but only two citations from *American Documentation* and one from the *Journal of Chemical Documentation* during 1964 suggest an undue neglect of documentation. The *Nachrichten für Dokumentation* list is balanced between East and West, and the *Revue Internationale de la Documentation* has obviously been trying to draw attention to the literature of the Soviet bloc. As might be expected of the VINITI service there is a close coverage of Soviet bloc literature and a very wide net; 522 titles are cited, although 268 of these appear once only. There are some unnaturally high figures for some titles (e.g. *National Micro-News*) probably because the service has been attempting to deal with a backlog. It is interesting that even with this wide net *Referativnyi Zhurnal* had only a 49 per cent coverage of the bibliography. It was also the slowest service: the fact that the items in the bibliography were of Western origin is partially offset by the fact that *Referativnyi Zhurnal*, appearing six times a year, has the most frequent publication of the five services. Preparation of abstracts translated into English (mentioned earlier) may cause further delay.

Between them, the five services abstracted from 762 titles, a rise from the 747 titles cited by Buntrock[3] where he looked at seven services over periods of two years. This rise is due partly to the increased coverage by the various services, but largely to the fact that *Referativnyi Zhurnal* has been included in this survey.

Of the 762 titles,

576 were cited by one service
113 ,, ,, ,, two services
42 ,, ,, ,, three services
17 ,, ,, ,, four services
14 ,, ,, ,, five services

Of the 576 cited by only one service, 372 came from *Referativnyi Zhurnal:* only 186 of the 762 titles were cited by more than one service. The fourteen titles cited by all five services were:

J. Chem. Doc.	131
Spec. Libs.	125
Lib. Resources	104
Akt. Prob. Inf. Dok.	93
Amer. Doc.	79
Lib. Assn. Rec.	76
Bull. Med. Lib. Assn.	76
Bull. Bib. France	71
Unesco Bull.	68
Lib. J.	67
Aslib Proc.	65
J. Doc.	45
Science	22
Meth. Inf. Med.	12

The figures are the totals of citations from the five services (including, of course, duplicated articles). The next seventeen titles, cited by four services only, introduce further important titles and the beginning of the technical and non-documentation range. The service in brackets in the third column below is the one that did not abstract from that title in 1964. These titles were:

Tud. Müsz. Tájék.	83	(*Amer. Doc.*)
Coll. Res. Libs.	77	(*Ref. Zhurnal*)
Nat. Micro-News	71	(*Lib. Sci. Abs.*)
Rev. Int. Doc.	71	(*Rev. Int. Doc.*)
Dok.	53	(*Amer. Doc.*)
Lib. Q.	39	(*Nach. f. Dok.*)
Herald Lib. Sci.	38	(*Amer. Doc.*)
Wilson Lib. Bull.	38	(*Rev. Int. Doc.*)
Nach. f. Dok.	31	(*Nach. f. Dok.*)
Libri	29	(*Nach. f. Dok.*)
Annals Lib. Sci.	21	(*Rev. Int. Doc.*)
Inf. Stor. Ret.	21	(*Lib. Sci. Abs.*)
IEEE Trans. Eng. Wr. Sp.	18	(*Lib. Sci. Abs.*)
Lib. Trends	18	(*Nach. f. Dok.*)
Bus. Automat.	13	(*Lib. Sci. Abs.*)
J. ACM.	12	(*Lib. Sci. Abs.*)
Mech. Eng.	4	(*Nach. f. Dok.*)

There are of course some important titles missing from these two lists. A third list can be formed from the remainder, consisting of those titles with totals of twenty-four or more citations. The figures in the third column show how many of the five services abstracted from each title. These are:

Nauchno-tekhn. Inf.	311 (3)
Reprog.	108 (2)
Tekhn. Bib-ki. SSSR	104 (3)
Met. Techn. Inf.	97 (2)
Sov. Bibliog.	97 (3)
JICST	54 (3)
Off. Mach. Guide	39 (1)
Techn. Knihovna	37 (3)
Office	37 (1)
Bull. AID	36 (2)
Lib. World	33 (3)
Buro. Org.	31 (1)
Comm. ACM	26 (3)
Amer. Doc.	25 (3)
DK-Mitt.	25 (3)
Knihovnik	25 (3)

Correction allowing for journal size

So far in this review the various listings have merely identified important titles.

In an attempt to rank the title list derived from an abstracts service in a more meaningful way the numbers of citations from individual titles appearing in *American Documentation* during 1964 were divided by the numbers of abstractable

TABLE 6. ***Abstractable articles in twelve titles in 1964 v. number abstracted by American Documentation in 1964***

	a = abstracts in *Amer. Doc.* in 1964	b = articles in relevant journal in 1964	$\frac{a}{b}$	Ranked position
J. Chem. Doc.	47	62	0.76	1
Spec. Libs.	20	119	0.17	9
Amer. Doc.	19	44	0.43	4
Rev. Int. Doc.	11	26	0.42	5
Lib. Resources	10	65	0.15	10
Aslib Proc.	8	25	0.32	6
J. Doc.	8	17	0.47	3
Nat. Micro-News	7	25	0.28	7
Inf. Stor. Ret.	7	10	0.70	2
Lib. J.	6	139	0.04	12
J. ACM.	6	43	0.14	11
Unesco Bull.	5	27	0.18	8

items appearing in those journals in 1964. The resulting figures are of course not 100 per cent accurate because 1964 abstracts would be of articles appearing in 1964, 1963 and possibly 1962. They are certainly accurate enough, however, for this purpose. This correction was applied only to journals abstracted by *American Documentation.* In fact, the same twelve titles appear at the top but in different order. The results of this operation can be seen in table 6. The ranked order does perhaps indicate more accurately the order of importance of titles, at least to *American Documentation.*

Science Citation Index

It might be relevant at this point to list those titles of documentation journals that have been included in the 1965 Source Index to the *Science Citation Index.* These are *American Documentation, Aslib Proceedings, Information Storage and Retrieval, Journal of Chemical Documentation, Journal of Documentation, Library Resources and Technical Services, Methods of Information in Medicine, Nachrichten für Dokumentation* and *Revue Internationale de la Documentation.* Additional titles of interest to documentalists include both the *Communications* and the *Journal* of the ACM, *Computer Journal,* the Transactions of the IEEE, and *Science.*

Nationality

Table 7 gives a breakdown for each abstracts service by nationality. Nationality has been taken as country of origin and some journals have been classed as

TABLE 7. ***Abstracts by Nationality, expressed as percentages of abstracts (upper row) and percentages of journal titles (lower row)***

		US	UK	English speaking	Non-English speaking	German	Russian	International	Unidentified
281 abstracts	*Amer. Doc.*	68	15	86	7	4	0	7	<1
88 journal titles		57	16	80	15	5	0	5	1
1003 abstracts	*Lib. Sci. Abs.*	35	19	67	29	5	1	4	<1
151 journal titles		22	24	61	34	6	1	3	3
589 abstracts	*Nach. f. Dok.*	28	10	41	50	22	6	7	2
169 journal titles		22	13	38	55	28	7	4	4
2538 abstracts	*Ref. Zhurnal*	25	8	37	57	18	19	4	2
522 journal titles		21	11	34	61	20	12	1	3
634 abstracts	*Rev. Int. Doc.*	16	4	20	76	4	39	2	1
151 journal titles		23	6	32	60	10	21	3	5

The contribution of Non-German literature to *Nach. f. Dok.* was 70% of the total number of abstracts from 65% of the journal titles.

The contribution of Non-Russian literature to *Ref. Zhurnal* was 75% of the total number of abstracts from 83% of the journal titles.

international because they usually carry articles in several languages, e.g. *Libri*, *Bull. AID* and the publications of Unesco, FID, and OECD.

From this data there appears to be a preponderance of documentation literature in the Western hemisphere, especially in the English language; e.g. only 22 per cent of the abstracts in *Nachrichten für Dokumentation* are from German articles and, surprisingly, only 18 per cent of the abstracts in *Referativnyi Zhurnal* are from Russian sources. Abstracts from English sources form a large proportion, (averaging about 50 per cent), the lowest being 20 per cent in *Revue Internationale de la Documentation,* which obviously concentrated on Soviet bloc literature in 1964, possibly in an attempt to counteract the lack of coverage in *American Documentation.* Looking at each pair of figures in table 7, the upper figure of percentage of abstracts can be compared with the lower figure of percentage of journal titles to give an idea of 'contribution ratio'. For example, in the column of German citations the percentage of abstracts is always less than the percentage of titles, suggesting that although there are some important journals they contribute comparatively little in numerical terms; the converse is true for American literature.

CITATIONS

Another and perhaps more meaningful way of identifying documentation journals is by looking at the references following articles. This is a true reflection of the actual use of the literature. There are of course many items that should appear in abstracts journals yet would never be cited, but a look at the citations provides a useful map of the literature.

Journals studied

Nine prominent journals were inspected: two American, two English, two German, one Russian and two international. The five-year period 1960–4 inclusive was used, except in the case of the *Journal of Chemical Documentation,* which started in 1961, and *Nauchno-tekhnicheskaya Informatsiya,* of which the 1963 and 1964 volumes and the first five issues of 1965 only were used. The same treatment was applied to citations as to abstracts, and lists for each journal title are set out below in table 8. Included in these lists are the numbers of citations

TABLE 8. ***Titles most frequently cited in articles in nine leading journals***

American Documentation 602 citations from 138 titles

Amer. Doc.	112	18.6%
Science	30	5.0%
Lib. Q. *IBM J. R&D* *Lib. Resources*	27	4.5%
Unesco Bull. *Comm. ACM*	22	3.7%
J. Doc. *J.ACM*	17	2.8%
Coll. Res. Libs.	15	2.5%

and 1	title	cited	14	times
3	"	"	11	"
1	"	"	10	"
1	"	"	9	"
2	"	"	7	"
1	"	"	6	"
6	"	"	5	"
7	"	"	4	"
9	"	"	3	"
18	"	"	2	"
79	"	"	1	"

Aslib Proceedings 287 citations from 106 titles

Aslib Proc.	37	12.9%
J. Doc.	26	9.1%
Amer. Doc.	23	8.0%
Lib. Assn. Rec.	20	7.0%
Spec. Libs.	10	3.5%
Lib. J.	9	3.1%
Science	7	2.4%
Coll. Res. Libs.	6	2.1%
IBM J. R&D		
Rev. Int. Doc.		

and 3 titles cited 4 times
6 " " 3 "
20 " " 2 "
67 " " 1 "

Dokumentation 362 citations from 88 titles

Dok.	119	32.9%
Nach. f. Dok.	45	12.4%
Wirtschaft	21	5.8%
Amer. Doc.	12	3.3%
Neues Dtsch.	11	3.0%
Techn. Gemeinsch.	9	2.5%
Einheit		
Erfind. Vorschlags.	8	2.2%
Met. Techn. Inf.	7	1.9%
Rev. Int. Doc.	6	1.7%
Tribüne		

and 2 titles cited 5 times
1 " " 4 "
2 " " 3 "
17 " " 2 "
55 " " 1 "

Journal of Chemical Documentation 657 citations from 135 titles

J. Chem. Doc.	107	16.3%
Amer. Doc.	97	14.8%
Chem. Eng. News	63	9.6%
J. Amer. Chem. Soc.	60	9.1%
J. Chem. Educ.	30	4.6%
Science	26	4.0%
Spec. Libs.	15	2.3%
Chem. Eng. Prog.	13	2.0%
J. Chem. Soc.	9	1.4%
Chem. Ind.	8	1.2%
J. Doc.		
Ind. Eng. Chem.		

and 2 titles cited 7 times
1 " " 6 "
4 " " 5 "
5 " " 4 "
12 " " 3 "
18 " " 2 "
81 " " 1 "

Journal of Documentation 140 citations from 45 titles

J. Doc.	36	25.7%
Aslib Proc.	19	13.6%
Amer. Doc.	7	5.0%
Libri		
Lib. Assn. Rec.	6	4.3%
Unesco Bull.		
Coll. Res. Libs.	4	2.9%
Harvard Lib. Bull.	3	2.1%
Z. Bibliothek. Bibliog.		
Engineering		

and 11 titles cited 2 times
24 " " 1 "

Nachrichten für Dokumentation 928 citations from 162 titles

Nach. f. Dok.	323	34.8%
Amer. Doc.	53	5.7%
Dok.	42	4.5%
Aslib Proc.	35	3.8%
Rev. Int. Doc.	33	3.6%
Dok. Fach. Werk.	23	2.5%
Z. Bibliothek. Bibliog.	22	2.4%
J. Chem. Doc.	18	1.9%
IBM Nach.	17	1.8%
Erfind. Vorschlags		

and 2 titles cited 15 times
1 " " 12 "
2 " " 9 "
2 " " 8 "
4 " " 7 "
1 " " 6 "
5 " " 5 "
5 " " 4 "
18 " " 3 "
24 " " 2 "
88 " " 1 "

Nauchno-tekhnicheskaya Informatsiya 544 citations from 143 titles

Nauchno-tekhn. Inf.	137	25.2%
Amer. Doc.	27	5.0%
J. Chem. Doc.	25	4.6%
Probl. Kibernet.	23	4.2%
Vopr. Yazkoz.	17	3.1%
Mash. Perevod Prik. Ling.	16	2.9%
Nach. f. Dok.	13	2.4%
Kibernet. Sb.	11	2.0%
IBM J. R&D	10	1.8%
Spec. Libs. *Office*	9	1.7%

and 2 titles cited 8 times
2 ,, ,, 7 ,,
5 ,, ,, 6 ,,
6 ,, ,, 4 ,,
12 ,, ,, 3 ,,
22 ,, ,, 2 ,,
83 ,, ,, 1 ,,

Revue Internationale de la Documentation 192 citations from 49 titles

Rev. Int. Doc.	30	15.6%
Science	24	12.5%
Nach. f. Dok.	18	9.4%
Unesco Bull.	13	6.8%
J. Doc. *Amer. Doc.*	10	5.2%
Spec. Libs. *DK—Mitt.* *S.A. Libs.* *Bull. Med. Lib. Assn.*	6	3.1%

and 2 titles cited 5 times
1 ,, ,, 4 ,,
3 ,, ,, 3 ,,
7 ,, ,, 2 ,,
26 ,, ,, 1 ,,

Unesco Bulletin for Libraries 336 citations from 97 titles

Unesco Bull.	57	17.0%
Science	29	8.6%
J. Doc.	19	5.7%
Amer. Doc.	18	5.4%
Rev. Int. Doc. *Lib. Trends*	13	3.9%
Lib. Assn. Rec.	12	3.6%
Libri	11	3.3%
Aslib Proc. *Coll. Res. Libs.*	9	2.7%

and 2 titles cited 8 times
1 ,, ,, 7 ,,
3 ,, ,, 6 ,,
1 ,, ,, 5 ,,
2 ,, ,, 4 ,,
1 ,, ,, 3 ,,
12 ,, ,, 2 ,,
65 ,, ,, 1 ,,

expressed as percentages of the total. In each case the largest percentage of citations is to the journal itself. These self-citations by journal are reasonably near to the figure of 20 per cent quoted by Garfield[4]. One does not expect citation behaviour to be the same for social science as for natural science and the discrepancies seem to have fairly obvious reasons here. For example the highest figures are from the two German journals, which presumably are forced by the language barrier to use their own language, and consequently cite fewer titles. *Nauchno-tekhnicheskaya Informatsiya* is a similar case, but the *Journal of Documentation* has a surprisingly high figure. Although it is perfectly natural for a journal to 'feed' on itself, it may be thought to be unhealthy for the self-citation percentage to be very much above 20.

The total number of journal titles cited by the nine journals in this study, mostly over a five-year period, is less than the total number of titles (762) abstracted by the five abstracts services reviewed earlier in this paper. Between them the nine journals cited from 528 titles with the following distribution:

378 titles cited by 1 journal
78 ,, ,, ,, 2 ,,
31 ,, ,, ,, 3 ,,
12 ,, ,, ,, 4 ,,
7 ,, ,, ,, 5 ,,
8 ,, ,, ,, 6 ,,
4 ,, ,, ,, 7 ,,
3 ,, ,, ,, 8 ,,
7 ,, ,, ,, 9 ,,

The seven titles with the distinction of being cited by all nine journals were, with total citations:

Amer. Doc.	359
Science	133
J. Doc.	127
Aslib Proc.	124
Unesco Bull.	114
Rev. Int. Doc.	99
Spec. Libs.	68

Cited by eight titles were:

Nach. f. Dok.	413
IBM J.R&D.	60
Coll. Res. Libs.	46

Cited by seven titles were:

Chem. Eng. News	98
Lib. J.	40
Lib. Resources	34
Bull. Med. Lib. Assn.	17

The top ten titles ranked by total number of citations were all cited by seven or more of the journals. The figures in brackets allow for the subtraction of figures for self-citation.

Nach. f. Dok.	413	(90)
Amer. Doc.	359	(248)
Dok.	176	(57)
J. Chem. Doc.	163	(56)
Science	133	(133)
J. Doc.	127	(91)
Aslib Proc.	124	(87)
Unesco Bull.	114	(57)
Rev. Int. Doc.	99	(69)
Chem. Eng. News	98	(98)

It may be noticed that eight of the nine titles selected for this review appear in this list, the ninth being *Nauchno-tekhnicheskaya Informatsiya,* which was chosen as probably the leading Soviet journal, but is not so likely to be cited in the West because of the language barrier. This operation rearranges the order of the ten titles and introduces the *Journal of the Chemical Society,* with sixty-two citations to replace the *Journal of Chemical Documentation,* which itself was responsible for sixty of the citations.

TABLE 9. *Citations by Nationality, expressed as percentages of citations (upper row) and percentages of journal titles (lower row)*

		US	UK	English speaking	Non-English speaking	German	Russian	International	Unidentified
602 citations	*Amer. Doc.*	75	10	87	7	4	2	5	<1
138 journal titles		59	19	82	12	4	4	2	4
287 citations	*Aslib Proc.*	40	52	93	2	2	0	3	1
106 journal titles		42	43	89	5	4	0	4	3
362 citations	*Dok.*	9	3	12	85	77	2	3	0
88 journal titles		17	6	24	73	56	6	3	0
657 citations	*J. Chem. Doc.*	85	7	93	6	5	<1	<1	0
135 journal titles		65	10	78	21	13	<1	2	0
140 citations	*J. Doc.*	26	56	84	5	3	0	11	0
45 journal titles		40	38	82	11	4	0	7	0
928 citations	*Nach. f. Dok.*	19	6	26	68	66	<1	6	<1
162 journal titles		27	5	34	60	53	3	4	3
544 citations	*Nauchno-tekhn. Inf.*	32	4	36	61	7	49	2	2
143 journal titles		34	8	41	52	11	29	4	3
192 citations	*Rev. Int. Doc.*	39	9	55	20	18	0	24	1
49 journal titles		39	14	61	25	16	0	10	4
336 citations	*Unesco Bull.*	37	17	56	17	9	<1	25	2
97 journal titles		33	17	55	32	10	2	5	8

The contribution of Non-German literature to *Dok.* was 20% of the total number of citations from 41% of the titles cited.

The contribution of Non-German literature to *Nach. f. Dok.* was 28% of the total number of citations from 41% of the titles cited.

The contribution of Non-Russian literature to *Nauchno-tekhn. Inf.* was 48% of the total number of citations from 64% of the titles cited.

Table 9 carries information similar to that contained in table 7 and gives a breakdown of citations by nationality. These figures show either that there is a serious language barrier or that the great majority of documentation literature is coming from the West.

Summary

It appears from the first part of the survey that none of the abstracts services is doing a very good job. The best coverage of the bibliography on 'Evaluation of information systems' was achieved by *American Documentation* (68 per cent) and *Library Literature* (58 per cent); these are both American services, the first providing as many titles as abstracts and the second being solely an indexing service. The other services had coverages of less than 50 per cent. Admittedly most of the services are largely selective, but even *Referativnyi Zhurnal* with its very wide coverage still appears to miss important material.

As an identification of key journals in documentation the review produces no surprises. The titles listed from the abstracts' count and the citations' count are roughly what any worker in documentation would have selected. The list may be further compared with that published by Whatley,[1] or to the titles found to be read by Aslib conference attenders in a small survey conducted by Hanson and Tilbury.[5]

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APPENDIX

List of journals mentioned in text and tables, arranged
by abbreviations and giving full title and nationality.

Akt. Prob. Inf. Dok.	Aktualne Problemy Informacji i Dokumentacji	Poland
Amer. Arch.	American Archivist	U.S.
Amer. Doc.	American Documentation	U.S.
Annals Lib. Sci.	Annals of Library Science	India
Aslib Proc.	Aslib Proceedings	U.K.
Bull. AID	Bulletin de l'Association Internationale des Documentalistes	International/ France
Bull. Bib. France	Bulletin des Bibliothèques de France	France
Bull. Med. Lib. Assn.	Bulletin of the Medical Library Association	U.S.
Buro. Org.	Burotechnik und Organisation	W. Germany
Bus. Automat.	Business Automation	U.S.
Chem. Eng. News	Chemical and Engineering News	U.S.
Chem. Eng. Prog.	Chemical and Engineering Progress	U.S.
Coll. Res. Libs.	College and Research Libraries	U.S.

Comm. ACM	Communications of the Association for Computing Machinery	U.S.
Computer J.	Computer Journal	U.K.
Data Proc.	Data Processing	U.S.
DK-Mitt.	DK-Mitteilungen	W. Germany
Dok.	Dokumentation	E. Germany
Dok. Fach. Werk.	Dokumentation-Fachbibliothek –Werksbücherei	W. Germany
Einheit	Einheit	E. Germany
Engineering	Engineering	U.K.
Erfind. Vorschlags.	Erfindungs und Vorschlagswesen	E. Germany
Harvard Lib. Bull.	Harvard Library Bulletin	U.S.
Herald Lib. Sci.	Herald of of Library Science	India
IBM J.R&D	IBM Journal of Research and Development	U.S.
IBM Nach.	IBM Nachrichten	W. Germany
IEEE Trans. Eng. Wr. Sp.	IEEE Transactions on Engineering Writing and Speech	U.S.
Ind. Eng. Chem.	Industrial and Engineering Chemistry	U.S.
Inf. Stor. Ret.	Information Storage and Retrieval	U.K.
J.ACM	Journal of the Association for Computing Machinery	U.S.
J. Amer. Chem. Soc.	Journal of the American Chemical Society	U.S.
J. Chem. Doc.	Journal of Chemical Documentation	U.S.
J. Chem. Educ.	Journal of Chemical Education	U.S.
J. Chem. Soc.	Journal of the Chemical Society	U.S.
J. Doc.	Journal of Documentation	U.K.
JICST	Japanese Information Centre of Science and Technology	Japan
Kibernet. Sb.	Kiberneticheskii Sbornik	U.S.S.R.
Kirjastolehti	Kirjastolehti	Finland
Knihovnik	Knihovnik	Czechoslovakia
Lib. Assn. Rec.	Library Association Record	U.K.
Lib. J.	Library Journal	U.S.
Lib. Lit.	Library Literature	U.S.
Lib. Q.	Library Quarterly	U.S.
Lib. Resources	Library Resources and Technical Services	U.S.
Lib. Sci. Abs.	Library Science Abstracts	U.K.
Lib. Trends	Library Trends	U.S.
Lib. World	Library World	U.K.
Libri	Libri	International/ Denmark
Mash. Perevod Prik. Ling.	Mashinnyi Perevod i Prikladnaia Lingvistika	U.S.S.R.
Mech. Eng.	Mechanical Engineering	U.S.
Meth. Inf. Med.	Methods of Information in Medicine	W. Germany
Met. Tech. Inf.	Metodika a Technika Informaci	Czechoslovakia
Nach. f. Dok.	Nachrichten für Dokumentation	W. Germany
Nat. Micro-News	National Micro-News	U.S.
Nauchno-tekhn. Inf.	Nauchno-tekhnicheskaya Informatsiya	U.S.S.R.
Neues Dtsch.	Neues Deutschland	E. Germany
N.Z. Libs.	New Zealand Libraries	New Zealand
Office	Office	U.S.
Off. Mach. Guide	Office Machine Guide	Nederlands
Off. Mag.	Office Magazine	U.K.
Org. Met. Techn.	Organizacja Metody Technika	Poland
Probl. Kibernet.	Problemy Kibernetiki	U.S.S.R.
Ref. Zhurnal	Referativnyi Zhurnal	U.S.S.R.

Reprog.	Reprogaphie	W. Germany
Rev. Int. Doc.	Revue Internationale de la Documentation	International/ Nederlands
S. A. Libs.	South African Libraries	South Africa
Science	Science	U.S.
Sov. Bibliog.	Sovetskaya Bibliografiya	U.S.S.R.
Spec. Libs.	Special Libraries	U.S.
Techn. Gemeinsch.	Technische Gemeinschaft	E. Germany
Techn. Knihovna	Technicka Knihovna	Czechoslovakia
Tekhn. Bib-ki. SSSR	Tekhnicheskie Biblioteki SSSR	U.S.S.R.
Tribüne	Tribüne	W. Germany
Tud. Müsz. Tájék.	Tudományos és Müszaki Tájékoztatás	Hungary
Unesco Bull.	Unesco Bulletin for Libraries	International/ France
Vopr. Yazkoz.	Voprosy Yazkoznaniya	U.S.S.R.
Wilson Lib. Bull.	Wilson Library Bulletin	U.S.
Wirtschaft	Wirtschaft	E. Germany
Z. f. Bibliotek. Bibliog.	Zeitschrift für Bibliothekswesen und Bibliographie	W. Germany

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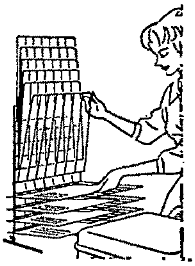

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SAT.23 – SUN.24.	Engineering Group conference, Leamington Spa. 'Standards, standardization and standards engineering.'

May

THUR.5 – SAT.7.	Midland and Northern Branches. Joint conference at Llandudno.
WED.11.	One-day conference on 'Handling confidential report material', Rembrandt Hotel, Kensington.
WED.18.	Electronics Group visit to Signals Research and Development Establishment.
TUE.24.	Evening meeting at Aslib. 5 for 5.30 p.m. 'The information services of the U.K. Scientific Mission in Washington', by Harry K. Bourne.

June

TUE.14.	Evening meeting at Aslib. 5 for 5.30 p.m. 'The background to presentation of BBC news on TV and radio', by Geoffrey Hollingworth.
FRI.24 – SUN.26.	Electronics Group 8th annual conference, Ashridge College, Berkhamsted.

September

SUN.25 – WED.28.	40th Annual Conference at Scheveningen (The Hague).

1967

October

MON.9 – THUR.12.	41st Annual Conference at Harrogate. See paragraph below.

This is YOUR Conference!

Are you satisfied with your Aslib conferences?—with the content and quality of the papers?—with the amount of time given to research, for example? Are you sick of hearing about machines, or do you want to hear more about them? Have you questions—or answers—on indexing, translation services and availability, abstracts, or reproduction techniques?

Satisfied or dissatisfied, every member of Aslib is invited to consider offering a paper for the 41st Conference to be held in Harrogate from 9th to 12th October 1967. Papers should be from 1,500 to 4,000 words in length and should deal with a subject connected with information or special library work. Contributions are particularly invited from members working in industry or in research establishments of any kind.

Anyone who wishes to take up this challenge should notify Aslib (Attention: Mrs H. J. Elphick, Meetings Organizer) not later than 30th June 1966 (30th July for Overseas Members) of his or her intention to submit a paper for consideration. The notification should, preferably, be accompanied by a 300–500-word summary, outlining the scope of the paper.

The Conference Committee will advise members as to whether or not their contribution can be included in the programme. Any paper accepted would be preprinted for distribution to all attending the Conference, and the author would be asked to introduce it briefly for discussion in depth.

40th Annual Conference, 1966

Programmes for the 1966 Annual Conference have been distributed this month. Any member who has not received his programme should contact the Meetings Organizer, Aslib.

April Evening Meeting

An evening meeting will be held at Aslib on Thursday 21st April at 5 p.m. Dr J. L. Dolby and Mr M. B. Line will speak on 'University libraries and the information needs of the research worker'.

Dr Dolby is Senior Research Associate with the Computer Typesetting Project at the University of Newcastle upon Tyne. An American ex-statistician, he is not only an expert on computers and the linguistic aspects of mechanization, but also has considerable interest in and experience of library matters. He has previously worked on character recognition by computer, and with M. L. Resnikoff compiled *The English word speculum*, a dictionary produced from computer tape.

Mr Line is Deputy Librarian of the University of Newcastle upon Tyne. He is especially interested in research on the attitudes and needs of library users, particularly in university libraries. He has published the results of two surveys and several critical articles on university libraries.

The two papers will explore the nature of the special problems facing the university librarian. Mr Line will speak as a provider of information and Dr Dolby as a consumer.

Confidential Report Material Conference

A one-day Aslib conference on handling industrial (scientific and technical) confidential report material is planned to take place at the Rembrandt Hotel, Kensington, on Wednesday 11th May.

Programmes and application forms will be sent out with this issue of *Aslib Proceedings*. The chair will be taken by Miss M. Gosset, M.B.E., B.SC., A.R.C.S. Papers will be given by:

Mr K. E. Jermy, M.A., A.I.M., A.I.INF.SC., Senior Editor, Library and Information Department, Reactor Group H.Q., UKAEA, Risley;
Mr S. A. Gerrard, Group Manager, Libraries and Technical Information Group, ICI Mond Division, Runcorn;
Mr D. F. Lyle, Manager of Mond Report Centre, Runcorn;
Miss E. I. May, A.L.A., Reading Room Librarian, Royal Aircraft Establishment, Farnborough.

Additional forms are available on request from the Meetings Organizer, Aslib.

Critical data compilation in Britain, 1965-66

This is the first edition of a list prepared and published by OSTI to identify centres where data are collected, evaluated and organized for use. Critical data are defined as 'the product of critical evaluation of measurements of basic properties of definable systems'.

There are sixty-five entries subdivided in sections covering: physicochemical and thermophysical studies (almost half), crystallography, nuclear physics, spectroscopy and optical methods, geophysics, materials science, fluid mechanics and design data. The list is limited to work in progress at the end of 1965 and to institutions whose work includes compilation. It is intended to produce a revised list each year and the compilers appeal for information about work which has not been included. OSTI is to be congratulated on its initiative in taking responsibility for this compilation, as data centres have a vital importance in the fuller documentation of the literature of science and technology.

Scientific Librarianship

The Department of Librarianship, Leeds College of Commerce, has announced a course 'designed to educate and train students in the expanding fields of science and technology'. The course, which will last for seven terms, is intended mainly for school leavers with A-level passes in biology, physics or chemistry. It will include lectures, seminars, tutorials, practical work, etc., and will qualify students to enter for the Part II examination of the Library Association, although the syllabus will be wider and the standards attained by students probably higher than is absolutely necessary for this examination.

NB—New Scientific Books

The first number of *NB*, an annotated list of new books published in English, French, German and Italian, appeared in February this year. The list covers all medical, biological, physical and technological sciences. Entries, which include a description or contents list of up to ten lines, are paid for by the publishers. It is hoped that the list will eventually be distributed to some twenty thousand libraries in universities, research institutes and industry, science departments in universities, editors of scientific journals, and appropriate bookstores.

An experimental Automated Bibliography will be provided automatically in the preparation of *NB* by tape-typewriter. It is hoped that a system will be developed for the immediate, automatic cataloguing of every book listed in *NB* by any library which uses a computer, and that the entire production of *NB* will be by Justowriter.

Digital Searching Services for Spectra

The Scientific Documentation Centre Ltd, of Dunfermline, Fife, has announced a new information service for chemical identification. The centre has approximately 64,000 infrared spectra and approximately 18,000 ultraviolet spectra coded on 80-column punched cards (ASIM data). These spectra can be searched by spectrum (coded to 0.1 micron), by chemical structure (a very detailed structural code is used), by empirical formula (for C, N, O and S), by elements (for the less common elements), or by any combination of these—giving a very powerful tool for identifying chemical unknowns.

The world of learning

The sixteenth edition, 1965–6, of this reference book is now available. More than 1,500 institutions have been added and several changes have been made in arrangement and format to facilitate rapid consultation. The book is available from Europa Publications Ltd, 18 Bedford Square, London WC1, price £7.

Food Science and Technology

The second International Congress of Food Science and Technology, which is to be held at Warsaw from 22nd to 27th August this year, will include discussion on the topic 'Abstracts and documentation'. A sub-committee report on international food science abstracts will also be presented.

Barbara Kyle

Members of Aslib, and her many friends all over the world, will have learned with deep regret of the death of Barbara Kyle on 29th March, after a long illness. In turn, a member of almost every Aslib committee and of the Council, Honorary Secretary, Chairman of Council and, finally, Editor of the *Journal of Documentation* and Research Librarian on the staff of Aslib itself, she was also one of the most sparkling personalities and original thinkers that the present generation of librarians can have produced. Above all, she was a wonderful colleague and a truly humane person.

Nothing, one suspects, could more forcefully express the loss to librarianship which her death represents than the fact that the entire issue of the *Journal of Documentation* for December, 1965, was written in her honour. It is comforting to know that, while she still lived, a few of her colleagues were thus able to convey to her a whole profession's affection and respect.

LOCAL CO-OPERATION—A POSITIVE FORCE

H. A. CHESSHYRE, F.L.A.

Senior Tutor Librarian, College of Technology, Hatfield

Evening meeting, London, 27th January 1966

THOUGH there may be little profit in tracing the antecedents of the local co-operative schemes between public, college, special and institutional libraries currently operating in this country, it is pertinent to recall the aims of the International Institute of Bibliography. The nineteenth century dream of establishing, by co-operation, a world bibliography of intellectual literature, and, more particularly, of supplying on demand comprehensive bibliographies on any specialized subject was obviously doomed from its conception.

In *Documentation* Dr S. C. Bradford pointed out that had the work been limited to the field of science and technology, where a demand was known to exist, the plan of Otlet and La Fontaine at the turn of the last century might have reached fruition. One of its many self-destroying features was the general realization of the colossal size of the centralized structure which would have resulted from such a universal collection.

The success of the local co-operation schemes which form the subject of this article is essentially due to the degree of decentralization, when viewed nationally or even regionally, which these schemes possess.

But what need is there for these schemes, when so many agencies already exist for the dissemination of printed materials and information? The short answer is that more information and interlending units are needed to meet rising demands. The regional and national interlending services created in the 1930s concerned themselves, as they still do, for the large proportion of their work, with books. Current needs demand not only books, but also periodical literature, technical reports and serial publications, photocopies and microforms of material in restricted access and, more especially, requests for information, particularly in the fields of science and technology. In this subject area speed in feedback of information and material is essential. A further important requirement is that the inquirer and the supplier of information should remain in contact with each other.

I am not claiming that material is supplied more rapidly through a local co-operation scheme than through the excellent postal loans service provided by the National Lending Library for Science and Technology, as an Industrial Liaison Officer observed in recent correspondence. The volume of local demand within a particular scheme is often considerable and it is unnecessary to transfer this burden of loans to the NLL if local resources are available for the price of a telephone call or a Telex message. SINTO reports a 40 per cent decrease in the exchange of periodicals over the past few years—a tribute to the efficiency of the NLL's service. The varied circumstances which brought the local co-operation schemes into existence make definition difficult. Essentially such a service consists of a number of interdependent organizations, not all of which possess established libraries, pooling literature resources to provide an interloan facility varying in its comprehensiveness and bibliographical support, and an information or inquiry service. This last feature requires qualification. An inquiry service, in my view, is a service which provides data from a search of printed sources. In addition, the information service possesses either a library staff capable of evaluating the printed material or subject specialists within the organization who may be consulted when literature sources prove inadequate. Such a service is available within industrial and research establishments and in colleges of further or higher education, but rarely on an adequate scale within public library systems.

Is there an ideal scheme for local co-operation? Obviously not, but there are factors which, if used creatively and formatively, will enable a scheme to be workable and efficient.

In correspondence, a number of librarians have admitted that schemes for which they are responsible have 'growed like Topsy' and that they are reluctant to impose any organized structure on their service. The extent to which the rate of growth will continue without growing pains becoming apparent will be proportionate to the size of the organization sponsoring and nurturing the sprawling infant.

The first factor implicit in any nascent local co-operation scheme is a close study of user requirements. Should this study disclose participants' needs to be sufficiently numerous and complex, the creation of an administrative centre in a unit adequately equipped with bibliographical resources and personnel is reasonable and economic. Optimization techniques still obviously belong within the confines of textbooks and periodicals on business management.

Secondly, the growth of the scheme needs close supervision at all stages of development. The constitution and regulations governing use must show a realization of this need. Instances occur where the success of a particular scheme has proved a limiting factor, as shown in the CICRIS boundary limitations since 1964.

Economic evaluation of the clerical methods used and techniques employed in locating, receiving, and disseminating material and data are closely associated with the preceding factors. There is little evidence concerning the costing of the machinery of co-operation in the literature publicizing the schemes or in correspondence received. Here the very informality can prove a danger. Good personal relations between borrower and lending library can result in attempts to satisfy an inquiry becoming grossly uneconomic.

The fourth factor required to ensure that a scheme is workable and efficient is adequate and varied publicity. NANTIS, CADIG, HATRICS and HERTIS use a logotype note heading and their other publications have a 'house style'. More important, however, is the publicity designed to keep members and others outside the scheme aware of its potential. Are visits to members made regularly? Is there adequate feedback on the efficacy of the loan and information services of the scheme?

A fifth factor is the range of services offered. As has been stated elsewhere, the backbone of most schemes has been the production of a union list of periodicals. Interloan services can be subject to local restrictions.

Further facilities include:

A union catalogue of books available for interlending.
Photocopy and photography services.
Training schemes for new staff of member libraries.
The production of bibliographies and reading lists.
Exhibitions and displays in factories.
Short courses on specific library subjects.
Conferences and courses of lectures.

In this context, mention must be made of current awareness services. Some schemes have a more dynamic conception than others of their responsibility for actively disseminating information on new products, processes and developments in subject fields of known interest to members. A weekly card service and a monthly bulletin are used by two schemes for this purpose. Senior staff members of libraries and information departments index reports and periodicals, and annotate entries for new books to provide this type of information.

Does the information service satisfy requests from literature searches alone? When these prove unsuccessful, has it recourse to subject specialists? Lecturing staff in Colleges of Technology and Further Education, where such institutions are members, are an immediate source. The question of calling on the knowledge of research and development staff in firms poses problems of industrial security and other limitations.

The need for consultation between those administering the co-operative schemes resulted in the creation of the Standing Conference of Commercial and Technical Library Co-operative Schemes, which held its first meeting at Sheffield on 16th March 1964. Mention of its activities has already been made elsewhere.

The place of the Industrial Liaison Officer, a recent development initiated by DSIR and now under the control of the Ministry of Technology, forms a complementary feature to many of the schemes. The ILO, appointed as a member of the academic staff of a College of Technology or College of Advanced Technology, seeks to assist local industry in the solution of production and administrative problems. Many of the solutions can be found by examining books, periodical and report literature, and other printed sources. In HERTIS, the ILO is also the Chief Information Officer of the Service; he is thus able to draw on the library resources of sixteen colleges of further and higher education. No duplication of effort between ILO and the local co-operative scheme is intended or indeed possible.

A quick look at the American scene indicates that the traditional British attitude of voluntary participation in local co-operative schemes (as with other aspects of library co-operation) is not emulated in the United States. The Committee on Scientific and Technical Information (COSATI) of the White House's Office of Science and Technology instituted a two-point plan for a solution of the information and document handling problems facing American scientists and technologists. The plan announced last August will establish:

> 'A network of library systems in scientific and technical fields, automated over a number of years at a cost of several billion dollars, to store, catalogue, and distribute books, periodicals and research reports.
>
> 'A parallel network of manned information systems that can respond to the more fluid demands for information by working scientists, engineers and research and development managers.'

The US Department of Defence is already operating such a system.

No one would suggest that even in microcosm the local co-operation schemes in this country parallel this scale of organized activity. What then of the future? Suggestions for future development include:

1 The retention of the Standing Conference of Commercial and Technical Library Co-operative Services to consider:
  - *a* a review of comparative financial outlay in the operation of specified techniques common to the schemes, e.g. lending routines, costs of keeping union lists up-dated, etc.
  - *b* the possibility of improving existing commercial library services throughout the areas covered by the schemes.
  - *c* increased interest in staff exchanges not solely at junior level, but also between different types of library, e.g. public and college libraries, where both are under the same local or county authority.
  - *d* examination of the possibility of sponsoring courses in new techniques applicable to library and information department staffs, e.g. courses on computer programming, work study, middle management (i.e. middle executive level), new developments in reprographic technology, and office machinery.

2 Consideration of problems in the supply and availability of report and series literature. The NLL files of AD and other reports are not neglected. CADIG's *Directory of membership and resources* contains in its Report and Series section an example of one scheme's awareness of this need. OTS and its successor, the Clearinghouse for Scientific and Technical Information, has established twelve regional centres in the U.S.A. for the maintenance of reports files to provide reasonable availability.

3 Urgent consideration of the recording and availability of translations. It would be interesting to know how many of the schemes have approached the European Translations Centre at Delft in this connection. Currently, the NLL is of limited value, and the return of application for translations from the NLL accompanied by their repetitious questionnaire occurs too frequently.

The following incomplete outline has been compiled with the help of many of the librarians directing the various schemes. It is offered to give an indication of the scope of the activities currently undertaken, although new developments are modifying many of the schemes. I should like to take this opportunity of acknowledging the wealth of material supplied and the very great interest shown in this article by the large majority of the librarians whom I burdened with my requests for assistance.

LOCAL CO-OPERATION SCHEMES

A SUMMARY OF THE MAIN FEATURES OF THE ESTABLISHED SCHEMES

BIRMINGHAM WORKS LIBRARIES LOANS SCHEME, 1956

Headquarters: Reference Library, Birmingham 1.

Membership: Firms maintaining a 'properly constituted works Library, under the charge of a Works Librarian or other responsible officer.'

Limitations: Works Libraries situated within Birmingham City Boundaries.

Services:

1 Loans of books, periodicals in the Reference Library to be used in works libraries.
2 Union list of technical periodicals operated in conjunction with scheme.
3 Technical inquiry service.

Limitations: No home reading.

Period of loan normally one week, renewable; certain items, one day only. Natural restrictions on loan of frequently used reference material.

Publications:

1 Regulations governing scheme, September 1962. (Publicity items.)
2 *Union list of technical periodicals.*

BRASTACS, March 1961

Bradford Scientific, Technical and Commercial Service.

Headquarters: Central Library, Bradford.

Membership: Establishments which aim to provide a minimum of 2[illegible] books and 3 periodicals.

Limitations: 'libraries . . . interested in general or special aspects of pure and applied science, or commerce, located in Bradford and district . . . currently nineteen member libraries.'

Services:

1 Interlending of books and periodicals in member libraries.
2 Brastacs union catalogue of books, maintained on cards at Bradford Central Library—more than 15,000 items.
3 Brastacs union list of periodical holdings, over 2,000 titles with locations from fifteen libraries.
4 Inquiry service for members operated from Central Library.
5 Co-operation with Industrial Liaison Centre, Bradford Institute of Technology, formerly YEWTIC.

Publications:

1 Constitution and publicity items.
2 Annual reports.
3 *Brastacs union list of periodical holdings,* October 1962. New edition in progress.

CADIG, 1953

Coventry and District Information Group.

Headquarters: Cadig Liaison Centre, Reference and Technical Library, Coventry.

Membership: No set qualifications but formal constitution adopted in 1960 and a current subscription rate of two guineas per annum.

Limitations: No geographical limitations—membership drawn from area bounding Birmingham, Nuneaton, through Rugby and as far as Northampton and Bletchley.
Currently thirty-nine member libraries.

Services:

1 Loan of library material of all kinds.

2 Information service largely clearing house—requests channelled to people capable of providing answer.

3 Union list of periodicals maintained at Liaison Centre, more than 3,000 titles.

4 Exchange service between members for surplus books.

5 Directory of members including nominated subject interests and list of reports and series, abstract and index holdings of members.

6 Newsletter published periodically.

7 Co-operation with local Industrial Liaison Officer.

Publications:

1 Publicity material and Constitution.

2 Newsletter.

3 *Directory of membership and resources,* 2nd ed. January 1966.

CICRIS, 1951

West London Commercial and Technical Library Service.

Headquarters: Acton District Library, High Street, W3, acts as co-ordinator. Each of the public libraries below is responsible for all libraries in its area.

Membership: Intending members should possess a library or collection of material, be willing to lend, and in general take an active role in the organization. Current annual subscription: one guinea.

Limitations: Boundaries: London Boroughs of Barnet, Brent, Ealing, Hammersmith, Harrow, Hillingdon, Hounslow, Richmond-upon-Thames (since 1964).

Services:

1 Union catalogue of periodicals.

2 Loan facilities for all types of material.

3 Information service.

4 Photocopy service and Telex.

5 Union lists including: periodicals; dictionaries (technical and translating); indexes and abstracts; directories, professional and trade registers, and yearbook for the British Isles; proceedings of conferences, congresses and symposia.

6 Exchange service between members for surplus technical or commercial publications.

7 Union file of trade literature published by members.
8 Co-operation with the ILO's in CICRIS area.

Publications:

1 Publicity material.
2 Annual reports.
3 *Union list of periodicals,* 2nd ed. 1963.
4 *Technical and translating dictionaries,* 1959. (New ed. in 1966.)
5 *List of indexes and abstracts,* 1958.
6 *Directories and professional* . . . (see above), 1959.
7 *Cicris Directory* (in preparation).

DORSET COUNTY CO-OPERATIVE SCHEME, 1962

Headquarters: County Library, Dorchester.
Membership: Technical College libraries, Weymouth Public Library and local special libraries in co-operation with the County Library.

Services:

1 Inter-loan of books.
2 Technical inquiry service.

Service still in embryo stage to judge from Dorset County Annual Reports.

ESSEX TECHNICAL AND COMMERCIAL LIBRARY SERVICE, 1958

Headquarters: County Library, Goldlay Gardens, Chelmsford.
Membership: No qualifications.
Limitations: Operation of scheme within county boundary.

Currently twenty-seven firms with libraries plus many smaller firms using service.

Services:

1 Loans of all types of material.
2 Production of bibliographies as requested.
3 List of abstracting journals.
4 Photocopy service.
5 Telex.
6 Microfilm readers available on loan.
7 Large store of periodicals on a co-operative basis.
8 Co-operation with Industrial Liaison Officers within the County.

Publications:

1 *Annual Report* (included in County Library Annual Report).
2 *List of abstracts available* (New ed. in progress).
3 Select bibliographies.

GTIS, September 1963

Gloucestershire Technical Information Service.
Headquarters: North Gloucestershire Technical College, The Park, Cheltenham.
Membership: Open to industry, education and general public throughout County area.

Services:

1 Loan of comprehensive range of scientific and technical literature of all types.
2 Current awareness service to industry by monthly bulletins in mechanical, production, electrical and electronic engineering.
3 Bibliographies produced on request.
4 Exhibitions of technical books indicating the Service's resources shown throughout the County.
5 Science teachers in schools receive selected journals in physical and biological sciences.
6 *Union list of serials.*
7 Subject specialization in Technical College Libraries.
8 Co-operation with Industrial Liaison Officers based within County.

Publications:

1 *(Union list of) serials,* 1965.
2 *Annual report* and publicity material.
3 Select bibliographies.
4 Monthly bulletins for current awareness service.
5 Booklists to accompany exhibitions.

HADIS, October 1959

Huddersfield and District Information Service.

Headquarters: Secretary: Mr S. T. Dibnah, Huddersfield Public Libraries.

Membership: Industrial firms and libraries in the Huddersfield area with further extension covering the Halifax area probable.

Intending members should take three periodicals, possess fifty books and be willing to lend.

Aims:

1 To increase local awareness of value of information.
2 To encourage the provision of training in the handling of printed information.
3 To co-ordinate local holdings of and organise the loan of recorded information.
4 To promote personal contact between people who want to know and people who do know.

Services:

1 Interlending service of technical and commercial literature.
2 Technical inquiries service.
3 Union list of books on management subjects.
4 Technical film shows.
5 Co-operation with local Industrial Liaison Officers.

Publications:

1 *Union list of subject dictionaries.*
2 *Translators in the locality.*
3 *Union list of periodicals.*
4 *Union list on management* (in progress).
5 *Query: a quarterly bulletin.*
6 *HADIS membership directory.*

HATRICS, 1964

Hampshire Technical Research Industrial Commercial Service.

Headquarters: Central Library, Civic Centre, Southampton.

Membership: Major commercial and industrial undertakings with academic institutions, research bodies and public libraries in Hampshire and adjoining areas.

Limitations: Area served covers central south coast.

Services:

1 Helping Hatrics members to help one another. Headquarters is the link in the information network.
2 Southampton Central Library acts as a clearing house for all inquiries.
3 Computer compiled *Directory of resources.*
4 Courses held on sources of information and other subjects.
5 *News bulletin* circulated to members.
6 Co-operation with local Industrial Liaison Officer.

Publications:

1 *Directory of resources.*
2 *News bulletin.*

HERTIS, 1956

Hertfordshire County Council Technical Library and Information Service.

Headquarters: Regional College of Technology, Hatfield, Herts.

Membership: Any industrial, commercial undertaking, local government department or individual capable of benefiting from the service. Subscription rates 5 *gns.* to more than 20 *gns.* per annum, depending on size of organization.

Services:

Based on the concept that the library facilities of the County's sixteen Further and Higher Education establishments should be made available to education and industry.

1 Union catalogue of stock of the three College of Technology Libraries.
2 Union catalogue of periodical holdings.
3 Inquiry and information service. (Specialists on College staff are prepared to assist in information problems.)
4 Interlending facilities.
5 Weekly card service to industry (within or outside County) of current information on nominated subjects from periodical articles and report literature. Small charge per subject made towards postal costs.
6 Extensive photocopying facilities.
7 Industrial Liaison Officer to maintain continuous contact between members to ensure fullest mutual co-operation.
8 Tutor librarians in the various college libraries to train future technologists, technicians and other personnel in techniques of searching, evaluating and applying factual information from literature sources.
9 Holding of short courses to further knowledge of 6 and 8.

Publications:
1 Range of bibliographies on specific subjects (printed list available).
2 Publication of reading guides.
3 *Provisional list of periodical holdings.*
4 *Hertis diary of forthcoming events.*
5 *News from the Industrial Liaison Office.*

HULTIS, 1953

Hull Technical Interloan Scheme.

Headquarters: Science, Technology and Commerce Library, Hull.
Membership: Intending members must possess three periodicals and at least twenty-five books and be willing and able to lend material.
Limitations: Confined to Hull and East Riding of Yorkshire.

Services:
1 Interloan of material with possible exception of current periodicals, confidential reports or material in constant use.
2 Union catalogue of books.
3 Union list of periodicals.
4 Inquiry service.
5 List of translators maintained.
6 Instruction in library work given to member libraries' unqualified staff at H.Q. library.
7 Advice in setting up a library service also given.

Publications:
1 *Annual report,* Regulations governing scheme.
2 *Hull commercial and technical bulletin.*
3 *Check list of members' periodicals,* up-dated monthly by cards.

LADSIRLAC, 1955

Liverpool and District Scientific, Industrial and Research Library Advisory Council.

Headquarters: Brown Library, Liverpool, 3.
Membership: Industry on Merseyside and in Western Lancashire, but no actual geographic limitation.
Two classes of membership:
Ordinary members—£3 3*s* p.a.
Members of the Industrial Liaison Committee—100 *gns.* p.a.

Services:
1 Production inquiry field service.
2 Literature searches.
3 *Ladsirlac information bulletin.*
4 Postal loans service.
5 Translations advisory service.
6 Exhibitions and lectures.

Publications:
1 Publicity leaflets.
2 Annual Reports.
3 *Ladsirlac Information Bulletin,* monthly.

LINOSCO, 1959

Libraries of North Staffordshire in co-operation.

Headquarters: Central Library, Hanley, Stoke-on-Trent.

Membership: Firms and institutions required to have a librarian in charge of their libraries.

Limitations: Libraries in North Staffordshire and South Cheshire only. Currently twenty-one member libraries.

Services:

A general scheme of co-operation.

1. Interloan of books and periodicals.
2. *Union list of periodicals.*
3. *Directory of members.*
4. Staff exchange schemes on a limited basis.
5. In service training scheme for junior staff.

Publications:

1. *Union list of periodicals* 3rd ed. being prepared.
2. *Directory of members.*

LIST, 1964

Library and Information Services, Tees-side.

(Information not available in time for inclusion in this summary.)

LUTON AND DISTRICT INFORMATION SERVICE, 1955

Headquarters: Central Library, Luton.

Membership: No qualifications needed.

Services:

1. Union list of periodicals (nineteen libraries' holdings included).
2. Interloan of books, periodicals.
3. Translation service available.
4. Technical inquiry service.
5. Training sessions for junior staff from participating libraries available in Luton Central Library.

Publications:

1. *Technical periodicals available in the Luton area,* 4th ed. July 1965.
2. Articles publicizing the service in local Chamber of Commerce journal.

MANCHESTER SERVICE TO INDUSTRY, 1948

Headquarters: Central Library, St Peters Square, Manchester, 2.

Membership: No regional or area limitations. Each firm or organization nominating responsible officer for liaison with the service.

Services:

1. Loans of library materials.
2. Technical inquiry service.
3. Staff exchange scheme in this country and abroad.
4. Panel of translators maintained.
5. Photocopy/photographic service.

6. Preparation of bibliographies.
7. Telex service.
8. Co-operation with local Industrial Liaison Officer.

Publications:

1. *Technical translating dictionaries,* 1962.
2. *What's available in the technical library,* 1964.
3. *Current abstracts and indexes,* 1963.
4. *Patents, a brief guide* (2nd ed. in preparation).

MISLIC, 1963

Mid-Staffordshire Libraries in Co-operation.

Headquarters: Formal headquarters, each library responsible for its own requests and loans.

Membership: No qualifications, but willingness to lend and agreement to make holdings of periodicals known.

Limitations: Area covering parts of Staffordshire south of LINOSCO scheme down to environs of Birmingham.

Services:

1. Loans of all types of library materials.
2. Staff exchanges.
3. Introduction courses for new junior staff beginning shortly.
4. Union list of periodicals.
5. Microfilm apparatus available for staff from co-operating organizations.
6. Co-operative storage of periodicals.

Publications:

1. *Union list of periodicals in the fields of science, technology, and commerce,* 2nd ed. June 1965.

NANTIS, 1962

Nottingham and Nottinghamshire Technical Information Service.

Headquarters: Commercial and Technical Library, Central Library, Nottingham.

Membership: Any library, information service, research organization, industrial or commercial firm in the City of Nottingham and the County. Associate membership to any similar organization in industrial areas surrounding Nottinghamshire.

Services:

1. Interloan facilities with the usual restrictions.
2. Inquiry service.
3. One-day training courses in library reference materials organized.
4. Periodicals exchange scheme.

   Co-operation with local Industrial Liaison Officer.

Publications:

1. Publicity material.
2. *Handbook and directory of resources,* 3rd ed. 1966. Annual.
3. *Technical periodicals review,* monthly.
   - Part 1: technical and engineering topics.
   - Part 2: management and business methods.

4 *Nantis news bulletin,* quarterly.
5 *Technical periodicals review,* monthly.

SINTO, 1932

Sheffield Interchange Organization.

Headquarters: Libraries of Commerce, Science and Technology, Central Library, Sheffield.

Membership: 'Open to any library in the Sheffield region with a minimum of fifty books and ten current periodicals.'

Limitations: Area covering Sheffield and immediate surrounding district.

Services:

1 Interloan of printed material (except confidential documents) using Telex and photocopying facilities. Not to be used for home reading.
2 Union catalogue of periodicals.
3 Union list of translations 1949–
4 Index of brand names.
5 Index to steel specifications.
6 Equivalents, index.
7 Active sponsorship of anything concerned with obtaining technical information.
8 Staff exchanges and training courses for new assistants in special libraries.

Publications:

1 *Union list of periodicals,* (new ed. shortly).
2 Annual reports.
3 *SINTO News,* 1965–

TALIC, September 1958

Tyneside Association of Libraries for Industry and Commerce.

Headquarters: Commercial and Technical Library, Newcastle upon Tyne.

Membership: Open to all libraries in the Tyneside area.

Services:

1 Interloan of printed material including use of telex and photocopying facilities.
2 Inquiry service.
3 Information service through Information Liaison Officer, North-East Development Council, NORTIC.
4 Union catalogue of periodicals, maintained at TALIC Headquarters.

Publications:

1 Report of progress (in *Newcastle upon Tyne Libraries Committee annual report*).
2 Publicity given in *Industrial Tyneside,* published by the Tyneside Chamber of Commerce.
3 Newcastle City Libraries *Technical Bulletin* produced quarterly features important additions to stock available through interloan.

THURROCK CO-OPERATIVE SCHEME FOR LOCAL INDUSTRY, 1959

Headquarters: Central Library, Orsett Road, Grays, Essex.
Membership: No qualifications other than willingness to lend material.
Limitations: Available to firms in the Thurrock area.

Services:

1 Loans of library material.
2 Technical inquiry service.
3 Union list of periodicals.
4 Production of select bibliographies on demand.
5 Quarterly booklists of additions to Reference Department circulated to all local industries.

Publications:

1 Bibliographies on management; annuals; directories and year books.
2 *Quarterly booklist of additions to Reference Department.*
3 *Union list of periodicals.*

DISCUSSION

Mr B. Agard Evans (Ministry of Public Building and Works) said that there was no mention of a technical inquiry service under SINTO in the list which Mr Chesshyre had circulated.

Mr Chesshyre said that this was SINTO's leading scheme.

Mr J. J. Eyre (G. A. Harveys) asked the speaker who normally started a new co-operative scheme. He felt sure that in his area, in Woolwich, there would be a great deal of interest in such a scheme, although at the moment none existed. Secondly, once a scheme was started, who was responsible for running it? He also called attention to the fact that a scheme was already operating in Lewisham.

Mr Chesshyre said that schemes were usually started as a result of discussion between two or three interested persons or organizations. In many instances they have been mooted by the chief librarian of the district. They have also been started by a number of firms getting together and then approaching someone to do the donkey-work. Many schemes have started without any structure at all, depending only on the sense of responsibility of individual members. This worked for a time but would gradually begin to break down, and if the scheme were to develop satisfactorily it would then be necessary to call a meeting of all interested parties to discuss the structure.

Mr P. J. Goode (Crosse & Blackwell Ltd) complained that his firm felt that they had little return for the money they paid into library services through rates. An Industrial Liaison Officer had, however, recently been appointed at the Borough Polytechnic. It would be interesting to see what work he managed to get going there.

Mr Chesshyre said that there seemed to be some confusion about duties of ILOs within a scheme. Their main duty was to survey the field and find out what needs existed. On being advised of these, the schemes should try to satisfy them in any way possible. For example, if their literature sources failed inquiries should be passed on. He stated that approximately 87 per cent of all requests could be satisfied within an organization by searching the literature, leaving a balance of 13 per cent to be satisfied by some other means. Where a scheme was based on a college of technology, as HERTIS was, information could often be found by direct application to members of the college staff. Providing firms in the district with information from the public library would probably be impossible. The cost of providing a technical book service alone was becoming rather appalling now that the average purchasing price for such books had risen to about £5 18*s*. He agreed that the worst fault of public lending libraries was the inevitable time-lag—anything up to four to six weeks—before requests could be met.

Mr S. Francis (School of Librarianship, North-Western Polytechnic) said that public libraries should be encouraged to spend rather more on their special collections. Secondly, there was a good deal of duplication between schemes' current awareness services. Could this not be avoided by a national service?

Mr Chesshyre replied that one could not yet know what OSTI might have up its sleeve regarding the possibility of a national current awareness service. Requirements such as these should be made known to OSTI. With regard to current awareness services, HERTIS had no actual regional boundaries and had members all over the country. Their service was obviously fulfilling a real need. So far the scheme had not outgrown its financial limits, although how much further it could be extended was unknown. Subscriptions were based on the size of the firm and depended partly on the use made of the service. This financed the scheme at present, but there was also, of course, a hidden cost—the labour given by library staffs throughout Hertfordshire. He did not see any chance of the service escalating to a national scale.

Mr D. Mason (ICI Dyestuffs Division) commented on duplication of effort in the current awareness services of the various schemes. He drew attention to existing published services, e.g. *Current chemical papers*, *Current papers in physics*, etc., and suggested that money spent on the current awareness services might be better employed in encouraging the start of further published services in other subjects.

Mr Chesshyre said that this was rather like the $64,000 question. It was difficult to talk about running any scheme but one's own. Undoubtedly every application for information cost a certain amount. Direct application to a firm might by-pass this expense, but presumably people consulted schemes because they did not know any original source. A lot of clerical work had to be done with each member's request because many of them had no information service of their own.

Mr D. W. Bromley (SINTO) said that there was a very thin or perhaps jagged dividing line between the functions of the public library and those of the co-operative scheme. In some cases the co-operative scheme existed to promote all functions of the public library. Sheffield's technical inquiry service, for instance, was operated by the public library and not by SINTO. This was why it was not included in Mr Chesshyre's list of schemes. It handled something like twenty thousand technical inquiries by telephone each year. Secondly, he was pleased to hear Mr Chesshyre offer some constructive suggestions on the Standing Conference of Commercial and Technical Library Co-operative Schemes. He was glad to hear Mr Chesshyre stress the need for public libraries to extend their commercial library service.

Mr D. Stanley (Standard Telecommunications Laboratories Ltd) said that at a meeting in July 1961 representatives of the leading electronic companies considered co-operation impossible due to their differing requirements. Secondly, he felt that there should be an index to subject bibliographies on the lines of the *Commonwealth translations index*.

Mr Chesshyre replied that there was a lack of good subject bibliographies. The cost of compilation would be high, and it would be difficult to find people with the time to do the job.

Mr J. Atkins (CADIG) questioned the speaker's suggestion that information groups were set up by public libraries for prestige reasons. He asked how many groups employed non-public library staff; what antagonism there was between established groups and the local ILO; and whether the appointment of an ILO in an area where a group already existed involved costly duplication of effort.

Mr Chesshyre said that it was difficult to elicit information about staff, though they were probably mostly public library staff. Relations with the ILOs were not always happy. HERTIS had been lucky to have an ILO attached to its own organization. But in many cases the ILOs were in a difficult position. It was to be hoped that relations would be improved.

Mr J. P. Moore (ILO Battersea College of Technology) said that ILOs were employed by the college or LEA, not by the Ministry of Technology, which did, however, give grants to help centres. He considered that ILOs were anxious to co-operate with schemes. Confusion possibly arose through the use of terms such as 'information service' in connection with them. The ILOs' information service was relatively crude by librarians' standards.

Mr W. Hughes (Road Research Laboratory) asked whether any co-operative schemes collected and listed bibliographies. Could not a centralized service be set up by some organization such as Aslib?

Mr Chesshyre said that none of the co-operative schemes did this. The question of national bibliographical centres had been discussed in the Library Association's programme 'Access to Information', and was under consideration by OSTI.

CONVINCING OUR CUSTOMERS

J. H. M. WHITTON

Director and Head of Training, The Tack Organization

Evening meeting, London, 29th November 1965

THIS evening I come to talk to an unusual audience, an unusual audience for me. Nevertheless, I believe that out of the material of this talk you will find a great many principles to help you in your own highly specialized task.

I come to talk of 'convincing our customers of the importance of information services'. This means performing the task of effective persuasion, a task carried out for centuries by princes, prelates, politicians—and proposers of marriage. Industry and commerce also have a word for this task—they call it 'selling'. The words 'selling' and 'salesmanship' today have an unfortunate connotation for many people, and it is time this shabby image of the salesman was dispersed. Denigration and defamation of salesmen is far too frequent and, very frequently, entirely wrong. Salesmen are men who work to professional standards, ethical standards.

The tast of selling an idea was not far from the mind of whoever composed the title of this talk. The word 'customers' is used and this betokens buying. If somebody buys something then it is reasonable to suppose that somebody must sell something. In your case you are concerned with selling an idea, an intangible. No matter what the product—consumable merchandise, capital equipment or service—the same principles apply when it is being sold, and these principles of salesmanship can be applied to your particular task of selling.

Salesmanship has no special secrets, and there is no mystique. Its principles are usable only in a given selling situation. It is equally important to remember that nothing happens until somebody sells something, and that this applies not only to goods and services, but to company image and company reputation. Marketing plans are abortive, horizons are unreached, until the selling act takes place. A building is cold unless given a 'life' force. A company is given 'life' force by its 'sales' force. A company's constant purpose is to ensure that the selling act takes place more efficiently, creatively, amicably. This is achieved through the salesman who lights and warms the building and helps to ensure the future. He is the true builder.

Salesmen are diplomats of commerce and have been called many things. A very good definition is—'He who works with his hands is a labourer. He who works with his hands and his mind is a craftsman. He who works with his hands, his mind and his heart is an artist. He who works with his hands, his mind, his heart—and his feet—is a salesman.' This means that the selling artist must go into the highways and byways to exploit his skill. No opportunity for a sale can be missed. No company can sit back; it must always seek more; it must always progress; the true builder, the salesman, seeks more.

What tools must a salesman use anywhere, therefore, to achieve his finest results? Firstly, he needs a sales sequence. This means ordered, patterned thinking. The surgeon knows exactly the order in which he will conduct his operation; the lawyer knows exactly the order in which he will present the facts of his case. A salesman must have a similar ordered pattern to ensure that all his facts are presented in logical order.

A good sequence for a salesman has six component parts. They are:

i Approach
ii Interest
iii Confidence
iv Presentation of the product
v Creation of the desire to buy
vi Effective closure of the sale.

Without a progressive discipline of presentation, sales creation is a gamble. Briefly, these components mean:

i An approach must arouse a new idea, a new thought in the prospect's mind.
ii This automatically stimulates a new spark of interest on which a salesman must build his case.
iii Confidence means establishing belief in the salesman. A salesman will use all the evidence he can find to do this. His evidence will include personal appearance, warmth of smile, reference to wide usage of the product in other spheres, possession of testimonials, modern research, etc.
iv The bridgehead of confidence enables a product to be presented against a background of acceptance, and, if this is done effectively, desire to buy is aroused automatically.
v The close of a sale can then be effected most efficiently, quite strongly and ethically.
vi There are many ways of closing, e.g. by offering a concession, by offering an alternative ('Shall we send ten dozen or fifteen dozen?') or, simplest of all techniques, by asking for the order.

The heart of a sequence, effective product presentation, is the key to successful salesmanship.

Selling means turning need into want, e.g. the need may be for a new pair of shoes, but the want may be for a pleasant theatre visit. Many methods are used to turn need into want. The salesman is most likely to achieve this transition if he analyses the product for all the buying reasons he can find. These must be expressed in terms of human benefit to the man who is going to buy, not in terms of technicality. These include the great human motives like gain of money or saving of money, pride of possession, pleasure in achievement, usefulness such as saving of time, labour and space, health, caution or fear, and sentiment—which means the satisfaction of some human feeling. 'Which means that' is the all-important phrase to remember. It enables the salesman to interpret product knowledge (technicality) as benefits.

The second tool of the salesman is effective and vivid use of words. There is no need to worry about accent. This is a precious inheritance; never seek to change it. Good delivery, expression of ourselves and our feelings is what really matters. Our feelings make words exciting and interest-catching. All we feel about our products and services should come out in our words. A salesman should constantly try to widen his vocabulary.

The third and greatest tool of the salesman is human relationships. This has been called selling oneself; it means, in simple terms, making oneself liked. In the last analysis acceptance as a friendly human being is essential. John Donne said, a long time ago, 'I am involved in mankind.' The conclusion and responsibility set out in these words cannot be evaded; they are all-important for the salesman.

Basically, human relationships stem from:

i *Sincerity,* in which there are no degrees. A salesman cannot be a little more honest today than he was yesterday. He is either honest or he is not, and it is on this absolute foundation that he builds human relationships.

ii *Loyalty.* Complete support for company and relationships of any kind is essential. The thought has been well put in these words: 'If you work for a man, in heaven's name *work* for him. If he pays you wages which supply your bread and butter, work for him, speak well of him, stand by him and stand by the institution he represents. If put to the pinch an ounce of loyalty is worth a pound of cleverness. Loyalty is indeed the first foundation of success in any business.'

iii *Enthusiasm.* This is the leaven in the daily bread of work, the power to believe in the job in hand, well put in words that are important to a salesman:

'Years may wrinkle the skin,
But to give up enthusiasm wrinkles the soul.'

How many salesmen go about their daily task with wrinkles in their souls?

Summed up, these transcendent qualities really mean courtesy and consideration for other people—and consideration for other people needs to have an element of sacrifice in it to make it worthwhile.

These, then, are the tools for the builder, the salesman, the man who will crown the work. These are the qualities that will help to light the windows, warm the house of the future. In their use I hope you will find complete fulfilment.

James Elroy Flecker said:

'We are the pilgrims, master.
We shall go always a little further.
It may be beyond that last blue mountain barred with sun
Across that angry or that glimmering sea.'

I hope that you too in your everyday task will find it possible by the use of these principles always to go a little further.

DISCUSSION

Mr T. Whitehall (Brooke Bond Tea Ltd) said that he knew nothing of selling, but he believed that Mr Whitton had neglected to mention the most important point. You must have a good product.

Mr Whitton replied that it was essential not only to have a good product, but to believe that it was good.

Miss M. Surry (Fawcett Library) asked how long a salesman should wait before trying again, after being turned down.

Mr Whitton said that the salesman should ask for an opportunity to be heard again as soon as possible, naming a day.

Miss V. M. B. Trasler (T. Wall & Sons (Meat)) asked how important letter writing was in the art of selling.

Mr Whitton replied that a letter was sometimes necessary, but was not usually as effective as an interview or a telephone call. It required a special skill. The best selling is done face to face.

Mr J. P. Moore (Battersea College of Advanced Technology) asked the speaker to assess the merits of the 'cold canvass', as contrasted with the prepared interview.

Mr Whitton said he preferred the 'cold canvass'.

Miss B. Sants (BP Research Centre) said that Mr Whitton had concentrated on effective methods for selling the idea of an information service, but she thought that most information staff were more concerned with the problem of how, having introduced the service, they could maintain an adequate after-sales service. In view of the continually rising costs of such a service, could the speaker advise on methods for effectively maintaining the persuasion needed to ensure that the service is continued satisfactorily?

Mr Whitton replied that this was an aspect of confidence, and depended on having the right mental attitude. Price had to be measured against benefit conferred.

Mr P. F. Cole (BP Research Centre) said that the employee 'selling' a service within his own organization was in a different situation from a salesman and usually faced the uphill task of convincing his superiors that the case was entirely watertight.

Mr J. A. Earl (Industrial Liaison Officer, Sunderland) said he had found it necessary to write and prepare his visits. Otherwise in the works a small point could create an argument and give rise to the situation in which he won the argument but lost the case.

Mr Whitton said that objections must be accepted and regarded as questions.

Mr C. E. C. Hewetson (H. J. Heinz Co. Ltd) suggested that the trouble with information departments was that they tended to try to help too many people too much and therefore overstrained their resources. Was it not better to sell, and support by after sales service, a more limited service?

Mr Whitton said that this was a very sensible comment. One could not sell what one had not got. It was better to provide a limited service to gain a reputation, and then one could build it up. An effective service must expand.

Mr A. E. Cornfield (Chemicals Department, BP Trading Ltd) supported Mr Whitton's recommendations to buld up the confidence of customers by providing an efficient service. He also endorsed the remarks of the former speaker. He added that having built up customer confidence with efficiency of service, it was more than likely that additional services would be requested. This was the opportunity to sell one's services, but one had to be honest with management and inform them that an increase in staff did not mean an immediate increase in the services to be provided. It was probable that the reverse would apply and that output would be temporarily reduced because the experienced had to train the newcomers.

Mr F. Liebesny (British Aluminium Co. Ltd) asked for the speaker's views on 'overselling' and 'underselling'.

Mr Whitton said he preferred 'underselling' to 'overselling'.

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☐ **Standards and Specifications Information Sources**—*Struglia*
☐ **Public Utilities Information Sources**—*Hunt*
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Aslib Proc. vol.18 no.5 pp.119-145 London, May 1966

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Main subjects include:

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(1958) 1,400 *illus.*, 1,845 *pp.*, *thumb indexed.* £11 10*s.*

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This reference volume defines and explains the mathematical terms and methods as applied to thirty-one fields of science and engineering, with language glossaries in French, German, Russian and Spanish.

(1960) 315 *illus.*, 1,215 *pp.* £11

STANDARD METHODS OF CHEMICAL ANALYSIS

6th Edn.

Vol. I. The Elements

(1962) 173 *illus.*, 1,500 *pp.* £9 9*s.*

Vol. II. Industrial Products and Non-Instrumental Methods (in two parts)

(1963) 250 *illus.*, 2,400 *pp.* (*total*)
Parts A and B £18 18*s.*

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(*June* 1966) *Illus.*, 6 × 9, 2,400 *pp.* (*total*)
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Multilingual indexes are given in German, Spanish, French and Russian.

Leaflet available.

(*April* 1964) 115 *illus.*, 1,334 *pp.* £11 15*s.*

PHOTOGRAPHY, ITS MATERIALS AND PROCESSES

6th Edn.

This sixth edition covers every aspect of photographic technology, from optical theory to the chemistry of negatives and prints. Electrophotography, xerography and photographic sensitometry are all included.

(1963) 369 *illus.*, 520 *pp.* £6

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2nd Edn.

With multilingual indexes in French, German, Russian and Spanish, "This wholly admirable work . . . ought to be in every laboratory library, and in the private library of every physicist or electronics engineer who can afford it."—*Proceedings, The Physical Society.*

(1961) 300 *illus.*, 1,360 *pp.* £11

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ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 18 May 1966 Number 5

ASLIB CALENDAR 1966

May

TUE. 24.	Evening meeting at Aslib. 5 for 5.30 p.m. 'The information services of the U.K. Scientific Mission in Washington', by Harry K. Bourne.

June

MON. 6 – TUE. 7.	Course on Business Information.
WED. 8.	Annual General Meeting. Connaught Rooms, Great Queen Street, WC2, 3 p.m.
TUE. 14.	Evening meeting at Aslib. 5 for 5.30 p.m. 'The background to presentation of BBC news on TV and radio', by Geoffrey Hollingworth. (See paragraph below.)
FRI. 24 – SUN. 26.	Electronics Group 8th annual conference, Ashridge College, Berkhamsted.
MON. 27 – FRI. 1.	Approaches to Information; a course on the fundamentals of classification and indexing. (See paragraph below.)

September

MON. 19 – SAT. 24.	32nd FID Conference. The Hague.
SUN. 25 – WED. 28.	40th Annual Conference at Scheveningen (The Hague). (See paragraph below.)

1967

October

MON. 9 – THUR. 12.	41st Annual Conference at Harrogate.

June Evening Meeting

An evening meeting will be held at Aslib on Tuesday 14th June at 5 p m. The speaker, Mr Geoffrey A. Hollingworth, who is head of the Radio Newsroom at the BBC, will be describing a kind of information work which is unfamiliar to most members, in sketching a 'Background to the presentation of BBC news on TV and radio'. Mr B. Agard Evans will be the chairman.

Further details may be obtained from the Meetings Organizer at Aslib.

Approaches to Information Retrieval

From 27th June to 1st July, Aslib will present a course on the fundamentals of classification and indexing, entitled 'Approaches to information retrieval'. This course is designed primarily to meet the needs of people faced with the problems of selecting systems of classification and indexing for new libraries or information centres, or contemplating the adaptation or replacement of existing systems. A number of the more important approaches to the problem of information retrieval will be described at some length, including the use of standard classification schemes such as the UDC, designing a special classification of one's own, alphabetical subject headings, and co-ordinate indexing There will also be lectures on the principles of evaluating systems, the theory of classification, problems involved in mechanization, and points arising in the installation of systems, as well as a demonstration of equipment. Aslib has secured the services of some of the leading exponents in this field as lecturers, including Mr C. W. Cleverdon, Mr B. C. Vickery, Mr D. J. Foskett, Dr H. Coblans, Mr E. J. Coates, Dr W. E. Batten, and Mr J. R. Sharp. Students should have made some previous study of the subject, either by attending one of the Aslib introductory courses, or by private reading. The fee for the course will be 21 gns. A full programme and application form are enclosed with this issue of *Aslib Proceedings*.

Annual Conference 1966

Members are reminded that Conference programmes and booking forms were distributed in April. It will be very much appreciated if applications to attend can reach Aslib by the specified, *i.e. 1st June* 1966. Overseas members have a month's grace, but please note than accommodation is already being booked up rapidly.

Management and Information Services

Information services cannot be fully effective unless their function and operational methods are clearly understood by management. It is therefore important that the managers of the future should receive some initial training in the role of information services and in a manager's responsibility for ensuring that his unit has adequate information facilities. With this in mind, Aslib has circulated copies of the following statement to the heads of all institutions in the United Kingdom known to be running management courses at an advanced level. As a follow-up, a one-day conference will be held on 10th June, at which teachers from the management schools and representative information officers will have an opportunity of exchanging views on this question and of considering a tentative plan for a series of lectures drawn up by Aslib.

MANAGEMENT COURSES:
APPRECIATION OF THE ROLE OF INFORMATION SERVICES

Effective management depends on good communications, and good information services are essential to any communications system. Without reliable information, decision-making must be based more on intuition than on informed judgement.

In the past, the handling of information has often not been the responsibility of a specialist department, but each individual has been left to acquire the information needed in his work, using his own knowledge and contacts. There is now a growing tendency to set up specialist departments to provide information and there are good reasons for this.

The increasing dependence of the country's economy on the results of scientific and technical research, on the one hand, and the increasing competition and the need to develop new markets at home and abroad on the other, have created a demand for much more, and much more specialized information, the handling of which is beyond the scope of those with other responsibilities, and without special training.

Research into information handling both in this country and overseas is revealing new ways of making information available to those who need it when it is needed. Some of them require advanced techniques and considerable capital outlay, and new training programmes are being set up to produce the information scientists and librarians needed to carry them out. If full advantage is to be taken of these developments, those responsible at the highest level should appreciate their value.

Many, even among the largest organizations, have been slow to make proper provision for information services, and even when the need is recognized, adequate resources and the trained professional personnel needed to run an efficient service are often not made available. On the other hand a few organizations, influenced by advertisements, install expensive mechanized equipment without a proper study of either the need for it, or the most efficient way of using it. In the long term it seems that the most effective way of meeting this problem is to ensure that those training for management are led to appreciate the value and potentialities of information services.

The subjects on which it is desirable to give instruction to those studying management include the following:

a *Sources of information.* These include not only published books and journals and more specialized publications (whose importance is often not realized) but the many experts and organizations of various kinds and the way they should be approached. There should also be some study of the ways in which information is generated and transmitted.

b *The handling of information.* The two most important topics in this field are the recording and retrieval of information and its dissemination. Information retrieval is a very technical subject about which management students need not know the details, but must have an appreciation of its technical and economic potentialities and limitations. Dissemination should ensure that information reaches the people who need it when it is needed, and implies the proper presentation by professional staff to increase the effectiveness of communications.

c *Personnel problems.* Here management students need to appreciate not only the professional qualifications that exist, but also the personal qualities required in information staff, to enable them to select staff wisely and to appreciate the different grades and kinds of staff required in information sections of different sizes.

d It is also desirable that the practical course-work given to the students should include problems which involve searching for information, so that they may learn at first hand something of the nature of the problem, and appreciate the assistance that can be given by a good information service.

If adequate instruction is to be given in these subjects, the courses must be organized and the instruction be given by people who really understand information problems. Aslib would be happy to collaborate with teaching institutions in drawing up programmes and suggesting possible lecturers.

It will also be essential that the institution should itself have a first-class library and information service. This means not only having a good collection of books, periodicals and more specialized publications, but also staff capable of organizing the information for use, ensuring that it is brought to the attention of teaching staff and research students, and also instructing the students to get the full benefit from the information that is available to them. Such a library and information service would be both a model to the students, by which they would judge the services of the organizations for which they work in later life, and a laboratory in which they make their own first experiments in using information. Aslib would also be willing to advise institutions on the organization and staffing of such services.

Aslib Criminology Group

A one-day conference on documentation in criminology was held at Aslib on Friday 5th November 1964. The papers were subsequently published in *Aslib Proceedings,* and a working party was set up to discuss the forming of a Criminology Group. This working party presented a report to a second meeting in January 1966 and a petition was sent to the Aslib Council. The Council has now agreed to establish the Group, with a Steering Committee composed of the following: Miss W. Elkin (Howard League); Miss A. A. Gough (Home Office); Miss M. Lattimore (London School of Economics); Dr R. Andry (Institute of Education); Mr D. J. Foskett (Institute of Education); Mr Hugh Klare (Howard League); Mr W. Steiner (Squire Law Library); Mr Martin Wright (Cambridge Institute of Criminology).

The following programme has been suggested:

Immediate activities: a directory of libraries engaged or interested in criminology in the United Kingdom and abroad; a union list of periodical holdings including current subscriptions; and a register of criminological research projects.

Longer term activities: lectures and visits to research centres and libraries, a study of the overall pattern of publication, including indexing and abstracting services; a co-operatively produced current awareness service; the production of special bibliographies and reading lists; and the production of a scheme of classification for the literature of Criminology. Any member of Aslib who is interested in this Group is invited to notify the Liaison Officer, Mrs Sauvée at Aslib.

Electronics Group

The eighth annual conference of the Electronics Group will be held as usual at Ashridge College near Berkhamsted from Friday 24th to Sunday 26th June. Dr W. O. Hassall of the Bodleian Library will open the Conference on Friday evening with a talk on 'Illuminated manuscripts', illustrated with coloured microfilm.

The sessions during Saturday and Sunday will include both subject and library papers. Mr Noel Isotta of the European Space Research Organization, and a former chairman of the Group, will speak on information retrieval.

Other papers planned are: 'Thin films' by Mr J. R. Balmer of the Royal Radar Establishment at Malvern, 'Voice patterns in speech' by Mr J. S. Williams of the Department of Electrical Engineering at the Bristol College of Science and Technology, 'Science Abstracts Research Project' by Mr J. R. Smith, Assistant Secretary of the IEE, a paper on the literature of electronics by Mr C. K. Moore, Librarian of RRE, and 'Road Traffic Control' by Mr E. Thorpe of the Automatic Telephone and Electric Company. Members are assured that all technical papers will be comprehensible to non-experts.

The full programme and application form will be circulated to all Group members in mid-May. Requests for additional information should be sent to Mr A. G. Barnes, Chief Librarian, G.C.H.Q., Priors Road, Oakley, Cheltenham, Glos.

Program

The growing number of computers installed in British universities, combined with the increasing interest among librarians in the possibilities of using them for clerical operations, has given rise to a new specialist journal, *Program*. The first, four-page issue, dated March 1966, contains an account by R. G. Woods of the use of an ICT computer in Southampton University Library. *Program* aims to provide news of computers in British university libraries, and the editor welcomes concise reports, letters, news items, etc., on this subject.

Program is available free to all interested persons. All correspondence should be addressed to the Editor, Richard T. Kimber, Queen's University School of Library Studies, 2 College Gardens, Belfast 9, Northern Ireland.

Index Radiohygienicus

The Institute of Radiation Hygiene, Prague, has recently published the first number of *Index Radiohygienicus; a current bibliography of world literature on radiation hygiene and biological effects of ionizing radiation, with author and keyboard indexes.* There are four issues to each annual volume, each containing a bibliography arranged in thirteen subject groups, a permuted title index compiled on a Minsk 22 computer, and an author index. The title index is cumulated annually. *Index Radiohygienicus* may be obtained from ARTIA, Smečky 30, Prague 1.

Current Issues

The Dag Hammarskjold Library has published number one of *Current Issues: a selected Bibliography on subjects of concern to the United Nations.* This succeeds the *List of selected articles,* the last issue of which appeared in September 1963. *Current Issues* contains citations to books and articles selected from periodicals received in the library from August 1963 to September 1965, selection being confined to literature on the work of the United Nations and the specialized agencies and on subjects of current or recent concern to them. Publications of the UN and the specialized agencies themselves are not included. *Current Issues* is obtainable from the United Nations, Sales Section, New York, NY 10017, price $1.

Thermal Abstracts

The first number of *Thermal Abstracts* has just been published by the Heating and Ventilating Research Association (HVRA), Bracknell, Berkshire. This journal is the result of an international co-operative scheme initiated three years ago at a meeting of REHVA (Representatives of European Heating and Ventilating Associations). Under this scheme, the twelve countries now taking part are each responsible for supplying monthly to the HVRA, abstracts, both in English and their original language, of their own and other selected journal and serial publications. The abstracts are then edited, classified and published at the HVRA.

Thermal Abstracts is published six times a year in A4 size, and in A7 sections for extraction and filing as required. The price is £1 10*s* to members of REHVA organizations, and £4 4*s* to non-members.

FID Conference, The Hague, 19th to 24th September 1966

Members will know that the Aslib Annual Conference in The Hague in September this year takes place immediately after the 32nd Conference of the International Federation for Documentation, of which Aslib is the British National Member. It has been so arranged in the hope that as many members of Aslib as can spare the time will attend both conferences and thus enjoy the opportunity of meeting professional colleagues from all parts of the world. We hope, therefore, that Aslib members will give serious consideration to this possibility.

The FID meetings are largely business meetings by the official committees of the FID, but a special feature has been introduced in the form of 'programme sessions', and it is these which will be of particular interest to members of Aslib. They take place on Thursday 22nd and Friday 23rd September, and provision is made for them to continue on the morning of Saturday 24th September, if the need arises. At these sessions, members of the FID Study Committees will speak about the work and plans of their committees, and the audience will be invited to suggest ways in which this work can be developed and made more effective for the benefit of all workers in the field of documentation. The subjects covered by these committees are:

Universal Decimal Classification (Secretariat at FID Headquarters)
Research on the Theoretical Basic of Information (Secretariat in the USSR)
Classification research (Secretariat in Denmark)
Theory of Machine Techniques and Systems (Secretariat in Sweden)
Technical Information for Industry (Secretariat in Canada)
Training of Documentalists (Secretariat in Poland)
Documentation needs of developing countries (Secretariat in Hungary)

Further information about the FID Conference may be obtained from The Secretary General, FID, 7 Hofweg, The Hague, Netherlands.

IATUL Seminar

The first IATUL Seminar on the Application of International Library Methods and Techniques will be held at the Delft Technological University Library from Thursday 1st to Friday 9th September. The seminar is intended for qualified librarians with experience in a research library, and the emphasis in lectures and discussion will be on methods and techniques which can be applied *now* in daily library routine. Subjects include exchange of publications, documentation, cataloguing, standardization, classification, loans, patent literature, research libraries, mechanization, library research and buildings—all considered from the international point of view.

The fee will be approximately Dfl.400. Inquiries should be addressed to Miss C. D. Wilson, c/o Library, Technological University Delft, Doelenstraat 101, Delft, Netherlands.

The Chemical Engineer and Mastery of Information

A meeting of the Institution of Chemical Engineers will be held at 2.30 p.m. on Tuesday 24th May at the Geological Society, Piccadilly, London W1. Papers will be presented by Mr R. Snel (Shell Company Ltd), who will speak on 'Information retrieval and decision taking', and by Dr W. E. Batten (ICI), who will speak on 'Information systems as an essential tool for the engineer'.

Further details may be obtained from the General Secretary, Institution of Chemical Engineers, 16 Belgrave Square, SW1.

DRTC Seminar (4) (1966)

The fourth annual seminar of the Documentation Research and Training Centre, Bangalore, is scheduled for December 1966. Its theme will be: 'Universe of knowledge, classification, and documentation'. Those who wish to submit papers should notify the DRTC immediately, giving an outline of the proposed paper. All inquiries and correspondence should be addressed to the Convener, A. Neelamaghan, DRTC, 112 Cross Road, Malleswaram, Bangalore 3, India.

Gramophone librarianship

The Department of Librarianship, Manchester College of Technology, has announced that its short residential course on gramophone librarianship originally scheduled for 18th to 22nd April 1966 will now be held from Monday 12th to Friday 16th September.

Modern Language Courses

The Modern Languages Department of the Holborn College of Law, Languages and Commerce is planning to hold courses beginning in September 1966 for the Conference Interpreters' Diploma (French and German into English, or French and Russian into English), and for the Diploma in Technical Translation (French and German into English; French and Spanish into English; or French and Russian into English, with special emphasis on scientific translation). Further information on these courses may be obtained from the College, Red Lion Square, WC1.

Information Scientists' Conference

The second conference of the Institute of Information Scientists will be held at Jesus College, Oxford, from Monday 11th July, till Wednesday 13th July, 1966. Two special features of this eight-session conference will be a contribution from OECD on government policies in relation to information services, and a session on scientific and technical information work in Denmark, Holland and West Germany, each country being represented by one of its leading information specialists. In another session, two acknowledged authorities on computers—one from a computer manufacturer, the other from a university—will take stock of the present position of computers in information work and assess the immediate outlook. The work of the Office for Scientific and Technical Information, the organization and costing of the systematic dissemination of information, assessing the needs of information users, and the education of information scientists are the other topics on which papers will be presented. Inquiries about the conference and requests for booking forms should be addressed to Dr D. J. Campbell, 54 Hurst Rise Road, Cumnor Hill, Oxford.

Mr G. P. Henderson

Mr Henderson, who is well known to members of Aslib as a former member of Council and member of the Publications Committee and the 1961 Annual Conference Committee, has resigned from the board of Kelly's Directories to become managing director of CBD Research Ltd. Mr Henderson was on the board of Kelly's Directories from 1964 to 1966, and was formerly Commercial Reference Librarian at the Guildhall Library.

Mr E. G. Hill

The death on 5th April of Mr E. G. Hill of the Office of Scientific and Technical Information came as a sad shock. Mr Hill was well known to many of our readers through his work in organising the DSIR's cover-to-cover translation of Russian journals programme and for the part he played in the planning and establishment of the National Lending Library of Science and Technology. More recently, first in DSIR and then in OSTI, he was particularly concerned with research in scientific documentation. His loss will be seriously felt by the Aslib Research Department, which benefited greatly from his advice and assistance.

Mr Hill, still a relatively young man and at the height of his powers, was married only a few months ago. Our sympathies go to his widow.

Is this YOUR Conference?

Every Aslib Conference is first and foremost a *members'* conference, but next year's, at Harrogate, will, we hope, be so in a rather special way.

Last month we issued a challenge (see p.88, *This is YOUR Conference*). Your response encourages us to repeat it now:

We invite every member of Aslib to consider offering a paper for the 41st Conference to be held in Harrogate in October 1967.

Papers should be from 1,500 to 4,000 words in length and should deal with a subject connected with information or special library work. We are particularly interested in contributions from industry and research establishments.

Already some members have told us they would like to submit papers for consideration by the Conference Committee. We feel sure there must be others who have views, results, or experience which could best be imparted to others at this conference.

If you would like to offer a paper, please notify us at Aslib (attention Mrs H. J. Elphick, Meetings Organizer) not later than 30th June (30th July for Overseas members), and give us, if you can, a 300-500-word summary of what you want to say. We shall be more than interested.

THE SHELL PHOTOGRAPHIC LIBRARY

R. J. McNEIL

in charge of Shell International Petroleum Co. Ltd's Photographic Library

Evening meeting, London, 24th February 1966

Introduction

SHELL companies are involved in two major industries, oil and chemicals, and are active in no less than one hundred countries. The activities themselves are many and varied—oil exploration, oil production, oil transportation (Shell has the world's largest single tanker fleet), oil refining and manufacture, oil distribution and sales. On the chemicals side there are manufacture and marketing. Throughout both fields there is a major research effort to improve methods and products and to find the new products which progress continually demands. Involved in this world-wide operation are over 200,000 people of differing races, nationalities, religions and political affiliations. Shell makes a very positive effort to keep the public informed about its activities through all the means at its disposal, including the Press, publications, employee magazines, exhibitions, and lectures; and this, of course, results in a constant demand for photographs—photographs to explain, photographs to decorate, photographs to dramatize, and so on. This activity is carried on to a greater or lesser extent in all countries where Shell companies operate, and all of these companies require a source of photographs.

The operating companies themselves are able to supply many needs from their own resources. A purely marketing company in Brazil, say, could, of course, produce pictures of its own marketing activities; but to illustrate the production of crude oil—how it is moved and how it is refined—or to illustrate any of the other facets of the industry—the research work that is going on, the manufacture and distribution of chemical products, agricultural pests which Shell chemists are continually looking for means to control, or the early days of the oil business—that company in Brazil has got to look elsewhere. And it was to provide a central source of such pictures that the Shell Photographic Library was set up in 1946, with the aim of maintaining an up-to-date coverage of all the main activities of Royal Dutch/Shell Group companies. The Library, it should be mentioned, is concerned only with photographs. Films are handled by another department.

The day-to-day running of the Library

The Photographic Library at present contains some 22,500 different photographs. The bulk of these, about 16,000, covers the entire range of the activities of Royal Dutch/Shell Group companies, as mentioned above, and includes numerous research subjects. The rest consists of a collection of about 900 portrait photographs of senior executives all over the world, about 5,000 photographs of agricultural and horticultural pests and diseases, and about 600 photographs of oil tankers. Since the main function of the Library is to provide material for what can be generally called publicity purposes, it does not hold photographs of experimental work, routine testing and similar subjects, apart from a selected few which might have outstanding photogenic qualities. This type of material is so specialized, and its value usually so restricted to the context of the project of which it is part, that we feel it is best kept by the specialists concerned, as part of the record of the particular project. Copies of the photographs can, of course, be obtained if they are required for other purposes. To run the Library there is a staff of three and a half: myself, a librarian, a caption writer and a young lady who joins us each afternoon to look after the filing and do other odd jobs.

The photographs, both black and white and colour, are held as 8½ in. × 6½ in. prints. The Railex system of suspended wallets is used for storing them. Normally we have about thirty to forty prints in each wallet, and each cabinet can hold about 7,500 prints. Because of limited demand, lack of adequate storage space, and problems arising from special masking to meet particular requirements, we do not hold slides, preferring to have them made as necessary.

A basic, individual and strictly factual caption is attached to every print for identification purposes. Photographs that fall into specific groups (of a particular refinery, for example) are also given a supplementary caption which we call a 'headstory', to provide additional, background details. The headstories are not normally attached to the prints actually held in the Library, but are attached whenever a new print is made to meet a specific request. There is a practical reason for the division of the captions like this. The basic caption is written, as far as possible, in such a way that it requires little, if any, subsequent alteration. The object of the headstory, in addition to providing background information, is to keep that background up to date. The headstories are checked annually (or, if need be, more often) and altered as necessary. If they were attached to the Library stock, the librarian would have to spend far too much time every year changing them. This, quite apart from being a boring and time-wasting chore, would involve a continual risk of damage to the prints with the regular ripping-off of old headstories.

Colour transparencies, of which we hold between 5,000 and 6,000, are far too valuable and delicate to be filed with the standard prints. Many of them, especially those in the collection on pests and diseases, are irreplaceable. Consequently they are stored in transparent plastic sleeves in Roneo cabinets. They are filed serially by Library reference number. To make them readily available for reference, but at the same time keep them out of danger, we have small colour prints made from them by one of the big commercial colour printing firms and mount these on cards the same size as our standard prints. One of the advantages of this is that captions can be attached to the backs of the cards—a thing you can't do to a transparency without spoiling the view. If a customer wishes to see the original transparency, say to check the colour values, it can readily be shown to him.

Until 1961, Shell ran its own photographic unit which took most of the photographs we required and did all of the necessary processing and printing. However, this arrangement ultimately proved too inflexible to meet our changing photographic needs. In that year arrangements were made with Film Centre International Ltd to take over the Shell Photo Unit and run it as an independent commercial concern operating as FCP Studios from which we now purchase our photographic requirements. This has proved very successful. As its origins imply, FCP is well equipped to handle a big company's needs and its high quality and service have earned it clients among a number of large companies which like ourselves require an efficient service with a minimum of administrative effort on their part.

FCP Studios store all our original black and white and colour negatives. This avoids continual movement of the material between different parts of London and reduces the risk of loss or damage. The caption service offers unique advantages from a photographic library point of view, as captions can present many problems. The Shell Photographic Service, of which the Library is a part, in addition to arranging for photographs to be taken for any of its clients, handles between 300 and 400 orders a month, which can be for anything from a single print up to several hundred, or for different quantities of several photographs. It is physically impossible to check every caption before completed orders are dispatched to customers and in these circumstances it is obviously inefficient to type them out as they are required. After discussion with FCP, we arrived at a system which I feel is as nearly foolproof as possible.

The original caption is prepared, typed and checked by us. We then produce a master copy from it by the Xerox process. We file the original typescript, and the master copy is sent to FCP, who make Ormig copies from it. If FCP's master copy is damaged or lost for any reason, it can easily be replaced by a new master copy. So, short of someone attaching the wrong caption to a photograph—and there are checks to guard against this—we can always be sure that the information that appears on the backs of photographs printed to order is identical with that which appears on the corresponding prints in the Library. We are spared the embarrassment of having the name of one of our Managing Directors misspelt or of discovering that a refinery has been credited with ten times its real production capacity.

Photographs reach us from many sources, either as direct commissions, from Shell companies overseas, or as speculative offers from independent photographers or agencies. It is impossible to include all of them in the Library and the responsibility for selection falls on me; of course I can, and do, seek a second opinion where I am in doubt. This selection involves the consideration of many factors, such as technical quality, reproducibility, present and future usefulness, and so on. There are, however, no inflexible rules. I will accept a photograph, even though it may be technically poor, if it is irreplaceable; at the same time I will unhesitatingly reject a superb picture if I think it has no place in our files. Selection of material which has no apparent present usefulness, but which might in future prove important, is something for which no guide is available. Given the choice between including everything or relying on instinct, backed by a broad knowledge of the oil industry, I prefer to work on the latter basis.

The possibility that a newly acquired photograph might duplicate one that is already in the Library is fairly remote, as most of the material coming in does so as the result of a direct request from us for pictures that we know we do not have. In cases of doubt it is easy enough to check against the photographs on file.

If we are sufficiently interested in a photograph offered to us on speculation, we buy the copyright and, if possible, the original negative.

Photographs which are considered to be 'classified' information at the time they reach us, but are likely to be released from security restrictions within a reasonable period, are dealt with, up to a point, in the same way as all our other photographs, except that, instead of being stored in the normally accessible files, they are kept under lock and key until they can be released.

The old classification system, and its disadvantages

The classification system formerly adopted was one that had been originally devised some years earlier for use in one of our technical departments. This system, as applied to our collection of photographs, suffered from several defects.

In the first place it was an unusual hybrid; it was an uneasy compromise between a partially developed alphabetico-classed catalogue and a conventional classification. Broad alphabetical subject headings were divided into sub-classes with decimal notation, and the latter sometimes into still more specific alphabetical sub-headings. (The alphabetico-classed catalogue was, it may be recalled, an interesting nineteenth-century bibliographical curiosity which allegedly combined the virtues of both the dictionary and classified catalogues, but which in reality brought together only their weaknesses.)

In the second place its chief characteristics involved a division by oil products which did not suit the natural breakdown of the collection by phases of the oil industry—for example, exploration, production, refining and so on. But, of course, the system had been designed for an entirely different purpose, and as far as I can see (this was long before I joined Shell, by the way), no attempt had been made to adapt it to its new use.

Thirdly, a considerable proportion of the collection could only be classified by locating it in classes other than those dealing specifically with the oil industry. The only provision for this was an inadequate General class with a limited and badly apportioned notational base. And as the number of photographs and their subjects grew and diversified over the years, this meant an excessively long notation, without the compensating virtue of an effective subject order.

Finally, it was not a system that could be learned quickly, and a mistake in classification by an inexperienced person could result in a photograph being lost in the files until it came to light again accidentally and the error was recognized and corrected.

It may be asked, therefore, why we used this system for seventeen years before we became aware of these defects, or why we did not try to do something about them sooner. The answer, quite simply, is that we had the same chief librarian for fifteen of those years. Her experience with the system ensured that errors in classification and failures in retrieval were kept to a minimum, I suppose, too, that the longer the system remained in use, the more reluctant people became to contemplate a change. After all, the prospect of reclassifying some 60,000 photographs, which was the size of the collection by then, was enough to daunt anyone.

About four years ago, however, we decided that the system of classification really would have to be changed, and we began to look for alternatives

The requirements of a new system

Looking at the situation from the point of view of the users of the pictures, we came to the conclusion that any new scheme for the arrangement and retrieval of the photographs would have to meet three requirements:

a it should be possible to select a specific photograph or photographs with narrowly defined characteristics from any broad area which might contain several thousand items;

b provision would have to be made for scanning broad areas where the requirements of the user were not as specifically defined as in *a*;

and *c* the system needed to be tailor-made to the collection and should be infinitely expansible in all areas.

The investigation and modification of the Keyword method

The Keyword method, which was already in use in the Shell organization, seemed to be the most likely candidate for providing a means of deep retrieval.

This method, as you may know, is a system of co-ordinate indexing using the optical co-incidence approach. Individual translucent sheets are allocated to selected Keywords, each sheet having 5,000 positions for punching. The selection of the Keywords required to describe a particular photograph is determined by the pictorial content of that photograph and the content of its basic caption. The correct sheet for each of these Keywords is then punched in the same position according to the serial number of the photograph being indexed. Thus each number refers exclusively to one photograph. Retrieval of a photograph or photographs is carried out by selecting the Keyword sheets indicated in the request and squaring them up on a board; if photographs containing the elements required are available, the co-incident holes in the sheets will become readily apparent and the positions of these holes will denote the serial numbers of any photographs for which all the Keywords selected are common.

The preliminary study of the application of this system to our Photographic Library presented what appeared to be a drawback. The standard equipment being used within the organization was 5,000-hole sheets. Thus even if the collection of photographs were to be ruthlessly pruned—and we were calculating on the withdrawal of around 30,000 items—the introduction of the Keyword method in an unmodified form might easily involve a search through half a dozen sets of sequences in order to retrieve a single photograph. Plainly, this would have been a waste of time, both for the librarian and for the potential user. And as the intake of new photographs is of the order of over 2,000 a year, the situation would soon get out of hand.

It was clear therefore that for the method to work successfully a pre-grouping of the items (from the retrieval standpoint) was going to be necessary.

Most inquiries for our photographs tend to fall within one of nine clearly defined, but complementary, areas of oil industry activity. Each of these areas was therefore made the basis of a separate system of Keywords, while in view of overlapping terminology a common dictionary or word-list was provided.

The areas chosen for separate Keyword sequences were: exploration and production; transportation of crude oil; manufacture of oil products; storage, distribution and marketing of oil products; research; welfare, training and general subjects; manufacture of chemical products; marketing of chemical products; and historical.

An individual code letter was allocated to each of these sequences for filing purposes—for example X for exploration and production, T for transportation, and so on.

It is possible in a few cases for a photograph to fall into more than one of the main Keyword sequences, but fortunately these marginal cases are rare. An example is the case of a photograph of an oil tanker discharging at a refinery. This could be filed either in the Transportation sequence or in the Oil Manufacturing sequence. But in such a case the choice of sequence would be determined by whether the tanker or the refinery was the predominant feature.

We felt that portrait photographs could be adequately filed alphabetically by the name of the individual represented. Similarly photographs of pests and diseases are filed under their common English names, though they can be identified under their scientific names by reference to a separately published catalogue.

We decided too that general photographs of individual oil tankers should also be treated on an alphabetical basis, although pictures of particular aspects, such as engine rooms, deck or accommodation details, would be included in the Transportation sequence of the Keyword system.

Even with these types of photographs excluded, we were still left with an enormous number of items that would have to be included in the Keyword system—well over 50,000—but at this point a change in policy enabled us to make a very substantial reduction; it was decided to remove from the Library all those photographs which did not have a direct bearing on the activities of Royal Dutch/Shell Group companies. This meant that we were able to get rid of about 15,000 pictures of general background subjects which had been acquired as a result of a number of overseas coverages made by staff photographers. Rather than destroy the negatives, since after all most of the pictures still had some useful life, we came to an arrangement with one of the major photographic agencies. They took the pictures and made them available to the general public. We in turn receive a proportion of the resulting reproduction fees.

To cut out the deadwood from what remained of the collection, we decided that all photographs made before 1957 should be scrutinized with a view to withdrawing them from the Library, allocating them to the Historical section, or allowing them to remain in current use. As you will appreciate, even an old photograph (and by this I mean one made ten or fifteen years ago) can be considered currently viable if the subject or technique shown has remained basically unchanged. This resulted in the elimination of roughly another 20,000 pictures. I might add here that, although these pictures are no longer to be found in the Library, we have retained the negatives, so that prints can be made to meet special requests.

The physical arrangement of the system

We had still to arrange the collection, which still numbered some 15,000 items, in such a way that either a single specific photograph, or groups of photographs, of particular subjects could easily be retrieved for users.

The Keyword method obviously covered the first of these situations. The second was more of a problem, because of the varied requirements of the users. Under the old classification system, we had stored two prints of each photograph, one filed by class number, the other serially by negative number. We decided to retain the principle of two sets. One of these would now be filed geographically by countries, and would become the master set; the other would be subdivided into fairly broad subject headings. To meet any requests for photographs by individual negative number, we retained one of each of the old catalogue cards, filed them serially by negative number, and annotated them so that the photographs to which they refer can be traced in either of the two sets of prints.

To make this arrangement clear it will be necessary to go into some detail.

As I have mentioned, code letters were allocated to each of the nine selected Keyword sequences. For the purpose of geographical identification, a simple code letter, or group of code letters, was allocated to each country; for example, UK, USA, N (for Nigeria), VEN (for Venezuela), and so on.

The main divisions in the geographical set are, of course, the countries themselves. The primary subdivisions are the nine selected areas of oil industry activity, and the secondary subdivisions are the individual numbers obtained from the Keyword grids. A separate storage wallet is used for each of the activity groups and the prints in each wallet are filed serially by the Keyword number.

For example, a photograph of a drilling site in Venezuela might be coded as VEN.X.1234, or a photograph of a synthetic rubber plant in Holland might be coded NED.K.1234. The fact that the Keyword number for both of these is the same is irrelevant because, of course, retrieval of either of the pictures is automatically governed by reference to the appropriate area of activity, i.e. exploration and production in the first instance, and manufacture of chemical products in the second.

For rapid identification, each wallet is labelled with its appropriate geographical and activity code letters and, if necessary, with the range of Keyword numbers in each wallet.

The same principle is followed in the case of the second set of prints which, for convenience, we call the browsing set. However, in this case the main division is by the activity sequence—X, T, M, and so on; the primary subdivision is by the particular subject and the secondary subdivision is again serially by individual Keyword number. No notice at all is taken of geographical distribution, as this browsing set is intended for users who want to see all available photographs of a specific subject. Thus all pictures of, say, catalytic cracking units will be filed under the M section (manufacture of oil products) in a wallet labelled 'M. Catalytic cracking units'.

Any spare prints of a photograph will also be stored with the browsing set, and all requests for the immediate supply of a print are met from here. If this should mean that as a result of meeting a request we are left with no copies of a particular photograph in the browsing set, we immediately have a new print made. This may take a couple of days, so there is the possibility that the next customer interested in the same subject may not see this particular photograph; but by and large we manage to file the replacement before such a request arises.

In very exceptional circumstances we will supply a print from the geographical set, but this is discouraged as much as possible. To strengthen the discouragement, all the prints in this set are defaced by cutting the words Library Copy into them with a die stamp.

One minor snag arises from the arrangement of the photographs, as I have described it so far. In some countries there is more than one oil refinery or research establishment. To meet requests for pictures covering these subjects generally, we have introduced a further subdivision into the appropriate activity groups of the geographical set, allocating a single refinery or laboratory to each subdivision. Thus in the UK.M section we have five extra subdivisions and in the UK.R section six extra subdivisions.

We also keep a simple register equating the Keyword number, the code letters of the nine activity sequences, and the code letters of the country in which the photograph was made. This is entered up as the pictures are indexed, so that a request for a specifically described picture, whose country of origin is unknown, can readily be traced to the geographical set.

If a photograph becomes obsolete, but we feel that it may have some future potential use—say as a historical survey of Shell activities—it can easily be transferred to the Historical section. This is done simply by deleting the original entry in the register, re-indexing the picture into the Historical section and making a fresh entry in the appropriate column of the register.

We have thus managed to arrange the collection in such a way as to meet practically any form of inquiry. It would of course be possible to refine the arrangement still further, in order to meet different varieties of inquiries of a general nature, but this could only be done by adding yet another set of prints. Quite apart from the limitation of space, we feel that the cost of doing this, which would amount to several thousand pounds, outweighs the marginal convenience gained.

The compilation of the dictionary

Having decided to adopt the Keyword method, our next step was the compilation of a dictionary or word list especially for the Photographic Library. To have taken one of the dictionaries already in use by another department and patched it up to meet Library requirements would merely have resulted in another unsatisfactory compromise, and we were determined to avoid this.

The new dictionary was compiled by a team of three, working every afternoon for about three months. The method involved the examination of practically every photograph and its basic caption. This was continued until a point was reached when no new terminology was forthcoming.

As new words cropped up during the study of the pictures they were listed on sheets and afterwards transferred to standard 5 in. × 3 in. cards. The team approach ensured a consensus on the terms finally adopted as Keywords.

Many photographs involved the application of oil products in a variety of industries and situations, so that the subject span covered was somewhat broader than is normally the case where Keywords are applied.

For this reason, the ultimate number of Keywords in the dictionary reached 1200 in the subject sequence. The number was kept as low as this by using combinations of Keywords to define composite ideas. For example, the word 'multigrade' was given the instruction 'use GRADE + MULTIPLE'.

Where words have different meanings in different subject areas, scope notes have been widely used. For example: 'draw(pull) use DRAG'; 'draw(lottery) use LOTTERY'.

See also references were used in the main subject sequence of Keywords, not to confuse the indexer, but to provide a partial answer to the problems of hierarchical punching which we wished to avoid. Admittedly a separate sequence of geographical terms includes instructions for hierarchical punching, but its organization is fairly straightforward and the time spent in punching is economically acceptable.

Time sheets provide for the retrieval of photographs where the date on which they were taken is a relevant retrieval factor.

In the two years since we began to operate the Keyword method we have added about 600 new words to the dictionary—mainly deriving from new photographs—but of these only about twenty or so have been new Keywords.

The implementation of the new system

The actual introduction of the Keyword method presented problems too. In the first place the Library had to continue functioning; the disruption of service on the few occasions when we have had to close it for a few days immediately before and after a move to new premises has been highly inconvenient to everyone, and to close for several months was completely out of the question. In the second place, if we had tried to carry out the change with the available staff (there are only three and a half of us, remember) and simultaneously continue the normal library service, it would have taken us literally years.

We decided therefore to have the indexing done by a small, select group of three people outside the Shell organization. Two of these people were retired Shell employees who had wide experience of the oil business in different parts of the world; so once they had been briefed on the principles of the Keyword system and the method of indexing, we could confidently leave them to get on with the job without constant supervision or having to refer back to us for explanations of techniques or processes shown in the photographs. The third indexer was a former school teacher who worked closely under our guidance. The punching was carried out in the Library itself by two temporary staff from an employment agency, while the filing of the pictures as they were dealt with was done by two more temporaries.

As a result of this crash treatment, we were able to transfer practically the entire Library from one system to the other in fifteen months, with no break in continuity of service, and only occasional inconvenience arising from an inquiry for photographs that were temporarily unavailable while they were away from the Library being indexed.

One or two further points may be of interest. All the significant details of each photograph and its basic caption are indexed, and we have found that, on average, about fifteen Keywords are required to describe a picture; in some cases as few as five Keywords may suffice, in others over thirty are needed. For retrieval, on the other hand, we find that the average is only about five; but, of course, this can be greater or less, depending upon the amount of detail contained in a customer's inquiry.

A very detailed request may result in only one photograph being shown as available, so that, even allowing for the time needed to extract the appropriate Keyword sheets, the required photograph can be produced within, at most, a couple of minutes. If more photographs are shown as available the time required to obtain them is naturally greater, but not significantly so.

Conclusion

The ultimate test of any system is, of course, the question 'Does it work?' In our case, I can confidently answer 'Yes'. We have had a relatively brief experience of the Keyword system, but it has worked for us satisfactorily so far, and I can see no reason why it should not continue to do so.

We now have a highly flexible system, which we did not have before, and one that has been geared to the requirements of the customer. What is more, in gaining this flexibility—and, I might add, simplicity—we have not had to sacrifice accuracy or reliability of retrieval.

There is just one other point, possibly a very obvious one, that I should like to mention before I conclude, and I think it is one that would apply to any photographic library, whatever system were used. However excellent that system may be, it will always be improved if the librarian in charge has a good visual memory. I do not mean, of course, that he or she should be able to recall every single photograph, but it is of great help to be able to remember at least four or five hundred. Unless the customer wants a particular photograph, or one showing some specific detail, he will quite frequently be fairly vague and ask merely for 'a good picture' of the subject he is interested in. If the librarian, relying on memory rather than on formal retrieval procedure, can produce such a picture in a few moments, the amount of goodwill generated is enormous.

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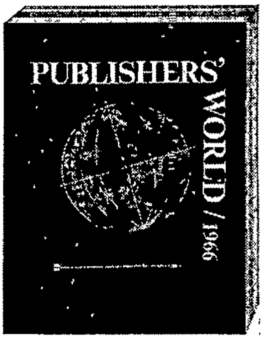

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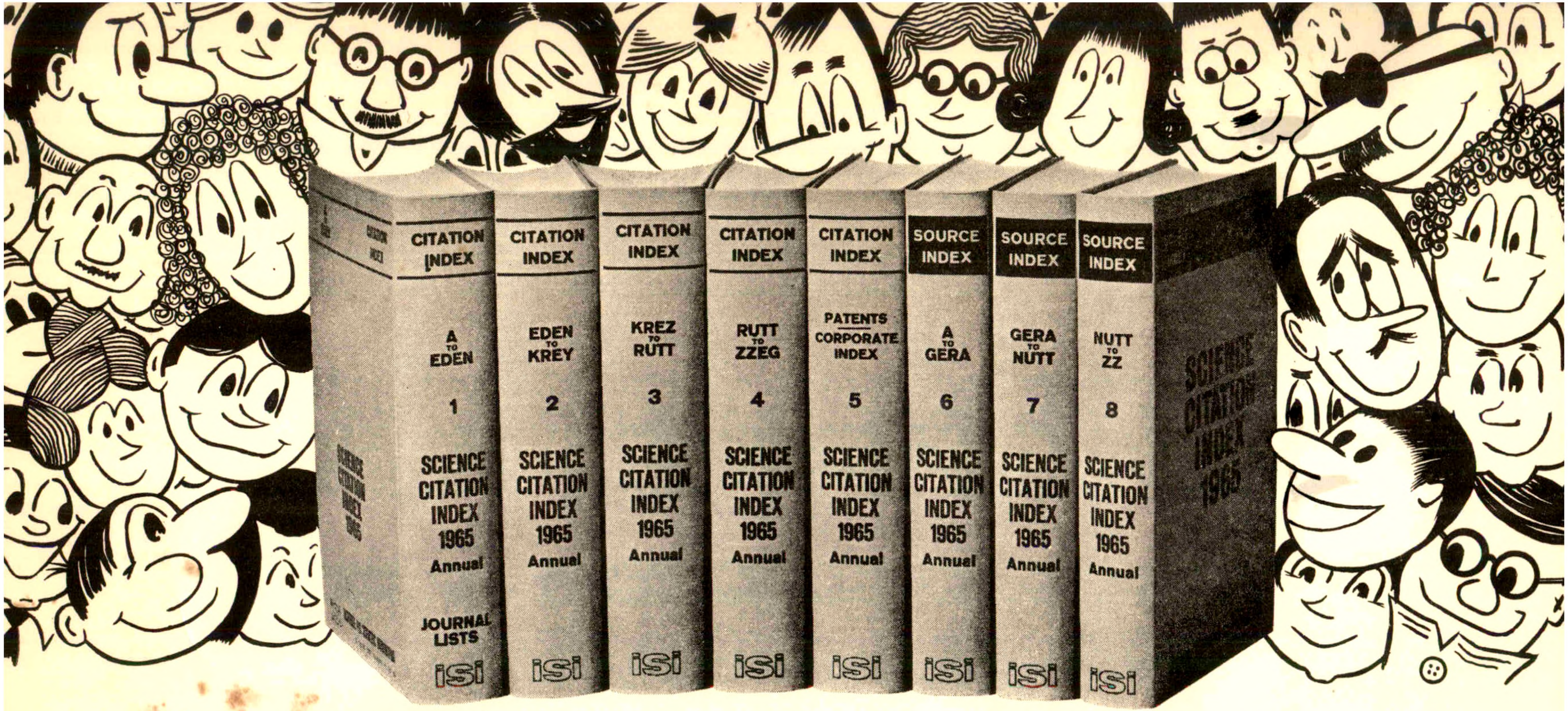
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THUR.11.	Transport Group visit to G.P.O. Railway Sorting Office.
MON.17–THUR.27.	Senior introductory course to special library and information work.
WED.26.	Evening meeting at Aslib. 5 for 5.30 p.m. 'The mechanization of serial records, with particular reference to subscription control', by Martin Scoones.
MON.31 – FRI.4.	Course on abstracting and co-ordinate indexing.
November	
MON.7.	Course on principles of information system design and planning.
TUE.8.	Course on principles of thesaurus development.
WED.23.	Evening meeting at Aslib. 5 for 5.30 p.m. 'Copyright', by G. Woledge.
December	
WED.21.	Members' Christmas Party.

1967

April	
FRI.14 – SUN.16.	Transport Group conference at Leicester University.
October	
MON.9 – THUR.12.	41st Annual Conference at Harrogate.

Headquarters meetings

Plans are being made for an evening meeting in July, this year, as well as for the new 'season' beginning with a meeting in September, further particulars of which will be available shortly. The dates are already given in the Calendar of this issue.

The July meeting is still uncertain. We hope to have with us Mr Joseph H. Kuney of the American Chemical Society, speaking about the use of computers in scientific publication. Unfortunately at the time we went to press he had not confirmed a date. Members interested in hearing him should contact Aslib (The Meetings Organizer) to find out when this meeting is being held.

Mechanizing the Library

The Aslib Research Department has been asked to organize an exhibition on information topics for the 1966 Annual Meeting of the British Association for the Advancement of Science. As a result an exhibition entitled 'Mechanizing the library' will be open from 10 a.m. to 5 p.m. throughout the meeting (1st to 6th September) in Room A 62 of the Trent Building, Nottingham University.

The purposes of the exhibition are to illustrate the growth, in quantity and in diversity of forms, of published scientific information (with particular reference to physics), and to show some of the ways in which machines may be used to simplify the storage and manipulation of it. Because of the difficulty of demonstrating the computerization of information retrieval, emphasis is placed on the simpler machine processes of document manipulation.

The National Lending Library is contributing a two-panel display on the growth and development of primary and secondary publications in the field of physics, two panels explaining and illustrating the work of the NLL, and a panel on report literature. Mechanical exhibits will include a Vonomatic tape typewriter, which produces eight-channel punched paper tape simultaneously with typescript, and will interpret and duplicate tape, an IBM 870 Document Writing System, accepting input from a keyboard, paper tape or punched cards, and producing output in variable formats on cards and/or a typewriter, a miniature Maul punched-card sorter of unusual design, a Filmac 400 reader/printer for reading and producing hard copy from a variety of microforms, a Recordak Kodamatic, which locates and produces hard copies of documents stored sequentially on 16 mm film, and a Recordak Miracode System which can perform logical searches of a subject-indexed microfilmed document collection and produce hard copies. G.P.O. Telex equipment will be on display, and a Telex link will be available for visitors to the exhibition who wish to make direct contact with the National Lending Library to arrange postal loans of scientific journals, and with Aslib Information Department to locate references on any topic. All the mechanical exhibits will be in operation throughout the exhibition.

A collection of documents borrowed from NERC is being microfilmed for use with the Kodamatic and Miracode; the document collection will be searchable in the former system via Termatrex cards, and in the latter by machine scanning of binary optical coding. The Institute of Information Scientists will display an outline of its operations.

The Aslib section will consist mainly of a Directomat machine, which will print at the press of a button answers of up to forty-five words to any of 120 different questions.

In addition to providing information specifically about the research, consultancy and other services of Aslib, the questions and answers will be designed to cover some aspects of scientific documentation, details of the exhibits, notes on OSTI, NLL, the British Association and the Institute of Information Scientists, and information on the local arrangements of the meeting.

Members of Aslib will be on duty throughout the exhibition. A descriptive 'handout' about the exhibition will be available to visitors.

Aslib Research Department

Members of Aslib will have realized from advertisements appearing during the past few months that, in preparation for Mr Hanson's retirement in May, 1967, steps have been taken to find in good time a successor capable of continuing and extending the excellent work started by Mr Hanson as the first head of Aslib's research department. Mr B. C. Vickery, who is well known to members of Aslib and, indeed, throughout the world as one of the outstanding contributors to the field of documentation, has now been appointed and will join the headquarters staff in September. Mr Vickery, who has worked with Imperial Chemical Industries Ltd, and has been Deputy Director of the National Lending Library for Science and Technology, is at present Librarian of the Manchester College of Science and Technology. He is a member of the Advisory Committee of the Secretary of State for Education on Scientific and Technical Information.

U.K. MEDLARS in Operation

A new computer-operated retrieval service for medical research workers has now begun to operate at the National Lending Library for Science and Technology and the Computing Laboratory of Newcastle University. This service, which is based on MEDLARS (Medical Literature Analysis and Retrieval System) developed by the U.S. National Library of Medicine, will be free of charge for an experimental period of two years.

During the past year programmes have been developed at Newcastle to enable MEDLARS tapes containing an index to some 300,000 of the world's medical research papers to be searched on an English Electric KDF.9 computer. The index will be updated monthly with magnetic tapes flown from the USA. Courses are being held at the NLL to train librarians and research workers in the use of the system.

Search requests will be received at the NLL, edited, and made up into weekly batches for the computer. A batch of twenty searches, done simultaneously, is expected to take three hours of computer time. Turn-around time for searches will, it is hoped, be from three to ten days.

Information Science at University College, London

A Readership in Information Science has been established at the School of Librarianship and Archives, University College, London, and Mr B. C. Brookes, Senior Lecturer in the Presentation of Technical Information at University College, has been appointed to the post.

Mr Brookes, a mathematician by training, has lectured at the Department of Engineering at University College since 1946, and is well known to Aslib members for his work on our Research and Publications committees and for editing *Editorial Practice in Libraries.*

He will act as tutor at the school to science graduates and others interested in scientific and industrial library and information services, and direct research into information storage and retrieval.

Iron and Steel Abstracts

From January 1966, the Iron and Steel Institute has introduced a new subject arrangement for the abstracts in its Journal and for the Institute's Abstract and Book Title Index Card Service (ABTICS). The abstracts were previously available in index card form in advance of publication, and provided full bibliographical reference, a serial number and a number of subject references in the form of full UDC numbers (Saville, J. P., *Aslib Proc.* 16, 283–90, 1964) Now, in addition, there will be a single, selected UDC number. These 'selected numbers' have been carefully chosen to bring out the most general aspect of the subject. In this way it will be possible to maintain a simple but practical subject index from one set of cards. Filing time will also be reduced to some forty-five minutes for each fortnightly batch of about 400 cards.

British Initials and Abbreviations

The second, revised and enlarged edition of this reference book has now been published. It contains the full name and address of associations, government departments, societies and institutions in Great Britain and also of international agencies and organizations of which the British Government and British professional bodies are members. The main arrangement is alphabetical by the abbreviation and there is a (rather weak) index under broad subject headings. The publication is available from Leonard Hill Books, price £2 5*s*.

British Acoustical Society

The existence of numerous societies and sub-groups within the field of acoustics, often with overlapping areas of interest, has long been considered unsatisfactory, and led in 1963 to the setting up of a Royal Society committee under the chairmanship of Sir Gordon Sutherland to explore the possibility of forming a British Acoustical Society.

The Society is now in being. Its interests include all aspects of sound, hearing and vibration, including ultrasonic activities such as the detection of flaws in solids and of shoals of fish in the sea, and currently important problems such as noise (aircraft, traffic, industrial), and musical acoustics. The Society will also sponsor teaching and research.

All inquiries should be addressed to Dr R. W. B. Stephens, Imperial College, Prince Consort Road, South Kensington, London SW7.

Microfilm Association

The second *Newsletter,* published in April, of Group A (Non-commercial users) of the Microfilm Association of Great Britain gives an account of meetings, including a one-day photographic school held at Senate House, London University. Members attending were able to inspect, and in some cases try out, various photographic and copying equipment, and to hear a panel of experts examine such problems as the use of ultra-violet light in copying manuscripts, copyright responsibilities, the relative virtues of various microforms, and standardization.

The *Newsletter* also records that the Group Committee is compiling a register of cameras, copiers, enlargers and readers in use in libraries and other institutions. The register is intended to enable prospective buyers of such equipment to contact present users and thus obtain an unbiased assessment of the suitability of the equipment before buying.

The secretary of the Group is Mr F. J. Bosley, 11 Walmer Close, Romford, Essex.

Library History

A new periodical, *The Journal of Library History,* which appeared in January this year, has as its aim 'to provide a continuing stream of readable, authoritative material in the subject areas of library history, philosophy, and comparative librarianship'. Subscriptions ($10 a year) should be addressed to Miss Marguerite Sellars, Library School, Florida State University, Tallahassee, 32306, USA.

Miss Maysie Webb

The Trustees of the British Museum have appointed Miss Maysie Webb Keeper in charge of the National Reference Library of Science and Invention. Miss Webb became Head of the Patent Office Library in 1960, having previously worked in industry as an information scientist. She joined the staff of the British Museum on 1st April 1966, when the Patent Office Library was transferred to the British Museum. She is the first woman to be appointed to the rank of Keeper in the British Museum.

As Head of the National Reference Library of Science and Invention Miss Webb will remain in charge of the Patent Office Library, which will continue to function under its new name of National Reference Library of Science and Invention (Holborn Division) until it can be brought together in a new building with that part of the National Reference Library of Science and Invention which is at present being built up under Miss Webb within the British Museum.

LIBRARIANSHIP AND OTHER DISCIPLINES

WILFRED ASHWORTH

Librarian and Information Officer, I.C.I. Fibres Ltd

Paper presented at Midlands Branch A.G.M., Tuesday 22nd March 1956

WHEN a scientist quotes, it is a generally accepted convention that his quotations must be almost mathematically apt. They must cover the point, the whole point and nothing but the point. Humanists are in a happier position—something reasonably near to the spirit of the idea to be conveyed is quite acceptable. Let it be understood, therefore, that I propose to begin with a *literary* quotation and borrow from Omar Khayyám the words:

> Myself when young did eagerly frequent
> Doctor and Saint, and heard great Argument
> About it and about; but evermore
> Came out by the same door as in I went.

so that I can specify in any terms I like the particular inconclusive 'argument' I have in mind. This is, of course, the one which has not yet been solved or given up—whether a special librarian carries out the same tasks as a general librarian (though more intensively) or whether his function is different in kind as well as in degree. This argument was bad enough in its day, but now, to add to the confusion, the sphere of interest which librarians (whether calling themselves 'special' or not) regarded as exclusively their own has been invaded by those who call themselves 'documentalists', 'information scientists', 'Literature specialists', 'systems engineers', and 'mathematicians', to say nothing of the new 'scientist-integrators', whose function is to survey, critically review and collate data.

Indeed the most significant feature of the world of information handling is the sudden, almost explosive, broadening of horizons which has taken place in recent years. This is not the same as the 'information explosion', though it is derived, to some extent, from attempts to develop adequate means of controlling the rapid growth in the quantity of material to be handled. It is more a change in character. J. H. Shera, in his *Libraries and the organization of knowledge,* refers to an 'additional dimension' of librarianship—which seems an appropriate description for this extension of the arena of information work. The problems to be solved are altogether greater than had previously been imagined. J. W. Perry, in one of his lectures, likens special librarians to aviators who took off for the moon in a propeller aircraft. At 20,000 feet they radioed back to earth the message: 'Everything going fine—destination visible straight ahead'.

To those librarians who still think that this was a perfectly reasonable message I would recommend a quiet evening reading the report of the Airlie conference, called by the Library of Congress and published in 1964 under the title *Libraries and Automation,* or perhaps J. C. R. Licklider's *Libraries of the future.* If this world of totally integrated information systems, computers which can be interrogated via typewriters or consoles, graphic storage techniques, and vast library communication networks is not science-fiction, then it is clear that librarians are no longer high priests of a domain they have long regarded as exclusively their own.

Believing, however, that librarians do still hold a dominant and key position, I would like to spend just a little time in discussing why this is the case, and what their most profitable future activities may be.

To do this I shall first consider the characteristics of information and the ways in which new discoveries are made.

As long ago as 1948 H. J. T. Ellingham prepared a 'Chart illustrating some of the relations between the branches of natural science and technology', and presented it to the Royal Society at its Scientific and Technical Information Conference.

Even then there was interplay of ideas, and information was slipping across the boundaries between disciplines. S. C. Bradford had noticed scatter even earlier. Any attempt to depict present-day intricate interrelations on a two-dimensional diagram would probably be doomed to failure. Modern knowledge is becoming increasingly inter-disciplinary in character, and no longer fits anything like so well as it did into the neat, watertight compartments of classification schemes.

Further, investigations of the psychology of creative activity suggest strongly that the combination of previously unrelated ideas is a prerequisite of innovation. Every information worker knows that these unrelated ideas frequently come from widely separated sources, especially in technological advance. Arthur Koestler, in an address to the British Association at its last meeting, quotes various authorities in these words:

> ' "Invention or discovery", wrote *Jacques Hadamard,* "be it in mathematics or anywhere else, takes place by combining ideas. . . . The creative act does not create something out of nothing like the God of the Old Testament, it combines, coagitates, reshuffles already existing ideas, facts, frames of perception, cognitive structures. . . ." According to *Sir Frederick Bartlett,* "the most important feature of original experimental thinking is the discovery of overlap . . . where formerly only isolation and difference were recognized." *Jerome Bruner* considers all forms of creativity a result of "combinatorial activity". *McKellar* talks of the "fusion of perceptions", *Kubic* of the "discovery of unexpected connections between things", and so on back to *Goethe's* "connect, always connect".'

As a typical example of unexpected synthesis, Koestler quotes the case of Möbius resistors. An electronics physicist ran into difficulties with radar equipment; brief pulses of high-frequency current gave rise to troublesome side effects of capacitance and inductance. The answer was found in an old parlour trick, the Möbius loop—a single loop with one twist. The new resistors are made by sticking two strips of aluminium tape to opposite sides of a non-conducting ribbon, twisting it into a closed loop, and soldering wires to opposite sides of the loop. If the pulsating electric current is now sent through the wires it divides, flows in both directions through the foil, and, since the Möbius loop has the singular property of having two sides but only one surface, the pulses apparently pass right through themselves, as it were, and the unwanted effects cancel out. When the inventor was asked how it worked he is stated to have replied: 'Maybe Maxwell could tell us, but he is dead'.

The new uses of fibre optics similarly demonstrate how known techniques can be reduced in scale and become capable of new applications quite unlike any of their previous uses.

I suggest that this need for combination is so fundamental that library systems should be designed to meet the requirement, thus enabling librarians to play an active and vital part in future innovation. The need probably explains the rapid growth of interest in post-co-ordinate indexing systems, in which topics are built up as required, as opposed to the more conventional systems, which attempt to anticipate the kind of detailed requests which future users will make. It is significant that these post-co-ordinate methods were devised by non-librarians, and have so far been more readily accepted by non-librarians. The first optical coincidence cards were invented by an ornithologist, H Taylor, who actually drew pictures of birds behind quite large holes. Uniterm indexing was invented by Mortimer Taube, a systems engineer. Many of the published descriptions of operating post-co-ordinate indexing systems are contributed by physicists, engineers, biologists and doctors to their own periodicals; they do not appear in the periodicals of librarianship.

The idea that our task is purely to organize knowledge by *logical* arrangement dies hard. We have gone a long way from the concept of the librarian as the custodian (if not the protector) of books, through the period when he was charged to index and classify the knowledge under his care for easier use, to arrive at the present time, when it is quite generally accepted (if not always put into practice) that he should also play a more active part and disseminate information. Is there not, however, a further stage now calling for acceptance?

D. J. Foskett, in his *Science, Humanism and Libraries* says:

> 'The special librarian has, in fact, a definite responsibility for seeing that the literature he collects is used, and he must therefore be both constantly on the alert for new information relevant to the work of his organization, and in a position to place it before those to whom it will be valuable. He must know the literature, and be prepared to use it on behalf of others, for it is often a waste of a research man's time to have to find the books and articles he needs, and even, sometimes, to read them in full. "Save the time of the reader" might well be called the First rather than the Fourth Law of Special Library Service . . . all these activities . . . are directed towards the transmission of knowledge from one mind to another; but apart from research into the techniques of our own profession, I do not think it is the business of the librarian to discover the new knowledge as well.'

While I would agree in general with this statement, the last phrase is open to some disagreement in the light of what we have been considering. Amongst a group of research workers the librarian occupies a unique position Much information passes through his hands and he alone, since he is not confined by the narrow specialization of his colleagues, can become aware of problems on the one hand and solutions which already exist on the other. Classification as a technique is already able to show where gaps in knowledge exist, just as it can show a gap in a library's own holdings. The librarian should also be able to perceive which items of knowledge might profitably be combined even though they may exist in disciplines far apart, even though he will not himself combine them or discover their full potentialities. Though it may not be his business to discover new knowledge, it is possible for him to deduce or infer consequences from stored knowledge, provided that he can redesign his systems to allow not only combinations of ideas to be made readily, but also to disclose automatically when there are statistical correlations between them. If this can be achieved, and there is already equipment available to combine feature cards statistically, as a start to the investigation of possibilities, then routes towards new combinations of knowledge can be signposted. Both the Jolley Feature Card Scanner in this country and the Termatrex Scanner in the United States will count and record coincident holes in stacked cards.

It has been taken too readily for granted that the most important function of literature research is to avoid useless and unnecessary repetition of laboratory and other research. Instead it ought to be recognized that a new duty is to discover profitable lines of approach, demonstrate gaps in knowledge, and indicate certain areas in which unexpected coincidences occur. As L. B. Doyle points out in his article 'Semantic literature maps for literature searchers', such searches find and utilize both the expected and unexpected. When something unexpected is found, one thereby obtains information; the expected is merely confirmation.

Thus a new function for the librarian emerges, and a new direction for research—namely, into systems which can both retrieve information when it is requested and generate fields of potential interest ahead of requests.

As I see it, the ideal system of the future must be organized

a To enable access by any level of inquirer, whether generic or specific knowledge is sought.
b To demonstrate automatically when ideas are neighbours of each other, and therefore are related.
c To uncover, automatically, valid statistical correlations between apparently unrelated matters.
d To enable methods found useful in one discipline to be retrieved if they are potentially useful for totally different applications in another.

Classification, co-ordinate indexing and Boolean strategy all offer part of the answer. Citation indexing, which seems to be attractive to scientists because of its capability for tracing already trodden interdisciplinary paths, offers another method, and, although it does not seem to be a particularly efficient one, it can perhaps fill a gap left by the other systems.

It is profitable now to discuss the extent to which evaluation is necessary in the provision of information. This is no easy matter to decide and I believe it to be one on which research must be concentrated to an even greater extent than it is at present. There are many facets of this topic. Study of the ways in which ideas are developed and used creatively will enable us to avoid any attempt to provide services which are inherently unsound, in that they offer 'unnatural' routes to new knowledge. A minor aspect of this, which has been partially studied, is the ways in which research workers seek and use information from services already in existence. As the volume of knowledge grows it will become increasingly important to evaluate and predigest the information passed on to inquirers. 'Not too little—not too much—but just right', a slogan which achieved much success in a recent advertising campaign, is particularly applicable to information retrieval. Innovation can be as readily stifled by too much information as by too little. The problems of relevancy and pertinency need to be resolved as much for the benefit of users as for their direct applicability to the design of information systems. It is no longer sufficient to apply classification to *information*. The needs of the user must be equally clearly analysed and codified, so that a complete match can be made.

Thus a fifth criterion for the ideal information system can be added:

e To provide for evaluation of pertinency of information, so that the requirements of each particular search can be accurately met.

In this connection I believe that the arguments which suggest the inevitability of an inverse relationship between relevance and recall are not only fallacious but dangerous. This is because they may inhibit attempts to improve systems, since it is taken for granted, in advance, that no system can give us the best of both worlds. A recent *New Scientist* article on the Cranfield investigations quoted their findings as meaning: 'The more useful information one is able to retrieve, the more useless information comes with it.' Put like this it looks an even greater fallacy than it does in its sophisticated form, though the *New Scientist* seemed willing to swallow the statement just as it stands.

The need for evaluation and filtering of information is obviously behind the present-day increase in interest in selective dissemination of information. The sheer bulk of information to be passed on, even within organizations with an apparently narrow range of interests, is making less attractive the 'classical' method of dissemination of information by means of current-awareness bulletins which, even at their best and when their contents are grouped, tended to operate by a blanketing operation and over-provision of information. Whether SDI can be operated with enough efficiency to provide safe coverage and whether users can be trained to provide adequate continuous feed-back for modifications of profiles remains to be seen. Its shortcoming is, of course, that just as classical retrieval systems cannot extract facets of information which had not been expected ever to be required (and therefore would not be classified), so SDI cannot provide information to users on matters in which they did not know they would be interested. Here co-ordinate indexing offers no help, either.

If the total information task is to be regarded as so much greater than had ever been thought, we need have no fear that there will be little place for librarians in the pattern which will emerge. D. R. Swanson, in the Airlie Conference Report, states:

> 'In my view therefore automation is far more likely to upgrade the profession of librarianship than to replace it. Automation upgrades it by permitting a

> sharper and clearer identification of that which is really of professional character in librarianship. Those librarians who have some kind of irrational antipathy towards mechanization *per se* (not just towards some engineers who have inappropriately oversold mechanization) I regard with some suspicion because I think they do not have sufficient respect for their profession. . . . Even in a completely mechanized library there would still be need for skilled reference librarians, bibliographers, cataloguers, acquisition specialists, administrators and others. Those librarians in the future who regard mechanization, not with suspicion, but as a subject to be mastered, will be those who will plan for our future libraries, and who will plan the things the machines are going to do.'

Though we may have to unthink and unlearn some of our fixed ideas, we can co-operate with experts from other disciplines towards the solution of information problems. From mathematicians and logicians we have received theoretical models for information work. The value of methods derived from these disciplines is that, if one is able to state a problem in terms or equations taken from them, then that problem is largely solved because the conditions of the situation have already been fully explored in the abstract. Thus, for example, if a problem in relevance is recognized as being a 2×2 contingency table, statisticians have already worked out all the possible ramifications of testing relevance. Developments in switching algebra have been discovered (by non-librarians) to be applicable to the theoretical examination of document selection. Now, switching theory has been developed to a high degree of sophistication, because telephone engineers require it for use in the field of communications, which is so important commercially that much effort has been expended on it. All of this information is available to be applied to the theory of selection—at the price only of our being capable of understanding it. Its importance cannot be overstated. J. C. R. Licklider, in the book which I have already mentioned, refers to the importance of building control paths into information retrieval systems, so that small amounts of control information can be capable of directing the selection, transformation and transmission of large amounts of substantive information.

Such ideas are at present alien to librarians, but they offer exciting possibilities. It is encouraging that Licklider is far less of a pessimist than some librarians have been concerning the future. He says:

> 'Although the size of the body of knowledge, in linear measure of printed text, is almost astronomical (about 10,000,000 miles), although that measure is increasing exponentially, and although the technology that promises to be most helpful to us in mastering knowledge is still young and weak, time strongly favours the technology. The technology, too, is growing exponentially and its growth factor is perhaps ten times as great as the growth factor of the corpus. Thus in the present century, we may be technically capable of processing the entire body of knowledge in almost any way we can describe; possibly in ten years and probably within twenty we shall be able to command machines to "mull over" separate sub-fields of the corpus and organize them for our use—if we can define precisely what "mulling" should mean and specify the kind of organization we require'.

In my opinion librarians, who have for so long worked and lived with knowledge in its present forms, will be the best people to work out the necessary specification. There are already cases where, left to themselves, systems engineers and computer specialists have run into operating difficulties which librarians could well have foreseen had they been consulted. Not all processes are feasible; some conflict with underlying natural principles. Mortimer Taube investigates some possible fallacies in his latest book *Computers and common sense* and claims that what looks to be a great mass of serious, detailed work carried out by scientists of distinguished reputation, supported by great American institutions whose names have become household words, evaporates when examined without prejudice. 'There are', he says, 'in the literature on mechanical translation, learning-machines, automata, etc., a great many names of non-existent machines whose operations are described and debated as though they were real. The whole performance takes on the character of the behaviour of the tailors in *The emperor's new clothes*. If one examines the vast new area of information retrieval one will find cases where simple library systems have been reinvented at considerable cost, though now they look complex and different under their new names and in their new dresses. Short cuts could sometimes have been taken if the librarians' precisely worked-out techniques of classification, indexing and file organization had been adopted or adapted. The fault is probably ours. We have been too inflexible in our ideas about librarianship and have tended to dismiss as not our concern almost all experiment, and to reject what we do not like or do not understand, or what has been put forward in our field by non-librarians. In this way we have lost some face as a profession amongst those with whom we could most profitably co-operate. The truth lies somewhere between the two extremes of utterly conventional librarianship on the one hand and attempting to devise systems which are impossible in the way in which perpetual motion is impossible on the other. The place of the librarian is, as it always has been and always will be, at the meeting point of disciplines in his role as an intermediary between cultures and as a catalyst to the endeavours of others. Communication barriers between disciplines are sometimes so high that an interpreter is needed. In the information field the librarian must specify the tasks that are to be done and co-operate with anyone who can help to meet the needs—whether they be publishers, systems' engineers, or any others in the spectrum between them.

This naturally brings us back to the age-old argument between librarians and special librarians. Does the special librarian need subject-knowledge, or can he employ his own techniques of searching for information to make up any imaginable deficiency in himself? Is librarianship the sole requirement?

The fact is that the argument is meaningless. There must always be a kind of duality between the information handled and the ways in which it is handled. Clearly the more that is known about the subject, the better it can be interpreted to others. But the field is wide. Librarians are needed with some knowledge of every discipline which exists, and schools of librarianship and universities must aim to supply them. The more graduates who can be persuaded to enter the profession the better, and if I plead especially for scientists it is only because there have previously been so few in our profession and because the swing towards science and technology has apparently not yet reached its limit. Finally, it is hard to escape the fact that, during the next twenty years, librarians will have to come to terms with more systems' engineers than publishers.

ABSTRACTS AND THEIR INDEXES—STYLE, PRESENTATION AND USES

N. W. WOOD, F.L.A.

Works Librarian, English Electric Co Ltd, Rugby

Paper presented at Midlands Branch Meeting, Coventry, Wednesday 16th February 1966

THIS paper discusses techniques of constructing abstracts, the layout of internal abstracting publications, ways of communicating and disseminating information, machine methods of compiling indexes, computer abstracting, and the relative value of abstracting services.

Introduction

As librarians and information officers, we are custodians of stored information, whether in the form of books, periodicals, reports, or other such media. We must accept that these information tools are simply primary sources of information and we must consider methods of communicating the content of these primary sources, in a convenient form, to our clientele. To achieve this we turn to the possibility of constructing secondary sources of information—our abstracting journals and other means of disseminating information.

Abstracts and Abstracts Journals

Accepting that the field of commercial abstracting is sparsely covered, and that the time interval between the publication of an article and the appearance of its abstract in commercially published journals is far too long, we turn to ways of filling the gaps by the publication of internal abstracts publications. This raises several points which I should like to consider concerning the abstracts themselves and the journals in which they appear.

Technique and Layout

We are told that the ideal procedure for abstracting an article is to begin by reading the article from start to finish, then to re-read it, making notes, then to construct the abstract, and finally to re-read the abstract, cutting it as much as possible. These theoretical instructions should produce the abstract in its ideal state, but is this procedure really a practical possibility in every case? If we consider these instructions in relation to the publication of a commercial abstracting journal the method may be acceptable, but for an industrial concern it is usually impractical. In my opinion, speed of delivery is the most important requirement. We just have not the time to maintain such high principles concerning quality—our aim must be high-speed dissemination. Perhaps we should also consider whether we, as librarians, are qualified to read and absorb a highly technical paper sufficiently to be able to construct an accurate informative abstract of it. What we must do is indicate to the prospective user what is available; he can then acquire the article in question and quickly decide whether or not it is of interest to him. Economics must also be considered. One must assess the time taken and the staff required to produce numerous informative abstracts each week, and set this against the possibility that the abstracts produced may only be temporary media, since the effort may be duplicated in time by the commercial services. In most cases a high proportion of articles published in internal abstracts publications appear in commercial services, since most of these articles appear in periodicals which are most commonly used. Quite often experience shows us that the gaps in the commercial services are similar to those in our internal publications—in both cases the material omitted is that which is not readily available.

There would appear to be three distinct styles of abstract. The first, if it can be called an abstract, is the quickest, and is simply a statement of author, title and bibliographical reference. Abstracts of this type are published in *Chemical Titles,* issued by the American Chemical Society. The second type is the indicative abstract, the length of which may be anything from a sentence to a small paragraph; this gives an indication of the type of information we would expect to find in the original article. This type has its value and is represented in many commercial and internal abstracts publications. The most lengthy is the informative abstract, which can be anything from a large paragraph to a number of pages, and in many cases can serve as a substitute for the article. The most notable examples of this kind are found in *Chemical Abstracts.*

The decision as to which type to use in any given situation will be discussed in a later section of this article.

Possibly scanning speed should be our prime consideration in the preparation of abstracts for internal publications. The following points would also appear to be salient:

a The publication should be issued as frequently as possible, preferably weekly, thereby limiting its size to workable proportions for the prospective scanner. About twenty pages should be sufficient. If it is too lengthy it will be psychologically intimidating.

b The bulletin should be sectionalized, similar subjects being grouped together, with cross references if necessary.

c It should have a distinctive cover, to make it bright, attractive, and recognizable.

d A system should be employed which provides for reference by number. This saves the time of both the engineer and the librarian when items are requested.

e The layout of the abstract should reflect the most convenient order for the reader—preferably title first, followed by author, the abstract itself and finally the bibliographical data. This helps the reader to scan the pages rapidly, especially if the titles are in capital letters, and alleviates the chore of ploughing through bibliographical data when the article may prove to be useless.

f Other useful information could be added to the bulletin, such as additions to stock, and notices of forthcoming meetings, conferences, etc These should, however, be kept to an essential minimum.

Relating the abstract journal to the organization

There is a place in industry for internally published informative abstracts. If one is issuing abstracts of foreign articles, for example, or of material not available in the library, this style is worth while. In the case of Research Associations and similar bodies, which abstract journals for members, this informative style can also have its uses.

All things considered, however, it is my opinion that in most cases the indicative abstract or even the title, author and reference alone is not only more convenient for the user, but also a more practical venture for the librarian.

The final decision, nevertheless, must depend on users' needs and should be considered in the light of local circumstances.

Incidentally, with reference to foreign language abstracting, it might be worth noting that it is estimated that, within the next fifty years, over one-quarter of the world's technical literature will be published in Chinese. Thus it would appear that the informative style of abstracting will be needed to a greater extent in the future.

Values of different methods of communication

There are several methods appropriate for communicating information to our clientele, perhaps the most frequently encountered being the internal abstracts' bulletin.

Before deciding upon any system for internal dissemination, however, a number of questions should first be considered:

a What system will be the most speedy in disseminating the information?
b Is it an economic proposition?
c Will it serve a purpose?
d Can a less expensive system be employed to do a similar job?
e Is it to be a permanent or a temporary record?
f Do the advantages balance the cost of output?

Once these aspects have been carefully considered, the decision as to what form your service will take can be made with more confidence of its success.

In my opinion the advantages of an abstracts bulletin or technical literature review are numerous, but other systems are being introduced.

The circulation of photocopied contents lists was once a common practice but this is now being discarded in favour of better systems. Undoubtedly this method had the advantage of speedy delivery, but it did not allow for any subject grouping of articles and it was indiscriminate in its treatment of material, in that it did not allow for clarification when the need arose. The result was an uninspired, uninformative and unimpressive service.

A recent and most interesting development is the single-sheet personal abstracting service. The prime advantage of this service is that the engineer is presented with material which is of direct interest to him, saving him the trouble of scanning perhaps a twenty-page abstracting journal each week. This method is being adopted by the CEGB and was described in a recent issue of *Aslib Proceedings*, in an article by Mr R. Hindson, who was operating such a service for management at Colvilles. This would appear to be an answer to the problem of disseminating relevant material to the individual. One must remember, however, that the initial compilation of the interests file is rather a large task, and in some firms interests are constantly changing hands. Staff movements are often not notified to the librarian and can result in needless effort on his part. Nevertheless, for top designers or management or some other select group of individuals, this system would appear to be very near to our professional ideal—the speedy exploitation of information.

Following from the foregoing discussion it may be of interest to mention briefly the work which is now being undertaken by the National Electronics Research Council, known as SDI, or Selective Dissemination of Information. In this mechanical system each prospective user provides the librarian with details of his subject interests; these must then be translated into the index terms, which are to be used in the computer and stored in a machine file. Documentary information is broken down into subject values, using the same thesaurus of indexing terms as was used in coding the subject interests, and these subject values are also stored in the computer in a separate machine file. Periodically the two files are compared automatically by the computer, and where there is a sufficiently close matching of terms, the bibliographical details of the document are printed out by the computer in the form of a personal bibliography. The advantages of this system would appear to be innumerable, but it may be necessary to await the results and conclusions of 'feedback' from users of the system before they can be accurately assessed.

It may be that this method could be envisaged as the abstracts bulletin of the future, although we should not overlook the fact that one of the greatest problems will be the compilation of the thesaurus.

Mechanical methods of abstracting

It may be of interest at this stage to pay some attention to mechanical aids to abstracting—computers. It was brought to my attention a short while ago that computers are being used experimentally for constructing abstracts directly from the originals.

As I understand it, the computer is programmed to scan the article so as to make word and phrase-associations, and to combine these to form a rather uninspired abstract. The dangers of this practice seem rather obvious. The most important would appear to be the inclusion of irrelevant material and incorrect associations. It is interesting at this stage, however, to note a feature of the 'Permutation Index' to the Preprints of the International Conference on Scientific Information, which was held under the auspices of the System Development Corporation in California in 1959. In the first section of this publication quite a successful system is employed, which appears to bear some resemblance to the principle of mechanical abstracting.

It appears that the title of each paper is listed, followed by various phrases, extracted from the text of the article, which help to put the title into context.

Take, for example, an article by R. C. Wright and C. W. J. Wilson of the Royal Aircraft Establishment entitled 'Classification with "peek-a-boo" for indexing documents on aerodynamics'. The following captions, along with the necessary bibliographical data, are to be found after the statement of title:

Aerodynamics—an experiment in retrieval.
Abstract.
R. C. Wright and C. W. J. Wilson, RAE.
Establishment—Farnborough—England.
Physical form of the index.
Choice of classification.
Indexing.
Description of tests.
Percentage Success.
Causes of failure.
Number of Codes Used in Indexing.
Time studies.
6 references.
Table 1. Answers to 100 questions and the searches based on them.
Table 2. Classification Schedules.

I agree that there are some odd entries here, but basically the list fulfils its purpose. It enables the searcher to establish quickly whether or not he may be interested in the subject content of the paper. This in itself gives speed of searching combined with speed of production, since the text is simply a reproduction of the captions found in each paper. This may not be enough, perhaps, and it is certainly not an ideal abstract, but it is original, helpful and speedy.

Mechanical methods of indexing

Some form of indexing should ideally accompany any abstracting publication. It is in this field that I believe automation has its greatest value to librarians. Even internal abstracting publications of a temporary nature could benefit by the addition of an annual index.

In an article entitled 'Autoindexing and Indexing by automatic processes' which appeared in *Special Libraries,* Vol. 56, No. 10, December 1965, Miss P. B. Baxendale stated that an index has three critical functions:

a It is a condensed key to the information contained in the collection;
b It bridges the semantic gap between the authors of literature and those who search that literature;
c As the medium or instrument by which information is searched, it discriminates among the documents of the collection.

The 'Key Word in Context' (KWIC) technique is possibly the most common mechanical form of indexing. The principle of this system is that the computer treats a title line as a continuous loop, and arranges for each key word in the title to be printed in turn in the centre of a column, thus bringing together to a certain extent articles of a similar subject content. The surrounding words show in what context the key word is being used. The danger of this method is that it relies on the wording of the title alone and thus a certain amount of dispersion of articles on the same subject is inevitable, a problem which is manifest in the Words and Authors Index (WADEX) to the *Applied Mechanics Reviews*:

GREASING
HYDRAULIC FLUIDS, use of
LUBRICANTS
LUBRICATING
LUBRICATION
OILING

Another obvious disadvantage is that, since key words are used indiscriminately, valueless words appear as the indexing terms, and the volume of the index becomes very large and cumbersome, although quite comprehensive.

The Concordance Words in Titles (CWIT) system of indexing would appear to be very similar indeed to the KWIC system, with similar defects:

a The scattering of like information because of reliance on the uncontrolled vocabularies of authors.
b The inclusion of unwanted and valueless entries.
c The use of general terms when specific terms would be of more value.
d The lack of adequate internal guidance, cross references, etc.

A similar system, which appears to be merely another name for the KWIC system, is 'Permutation Indexing', which also employs cyclic permutation of words extracted from the titles, authors' names, headings, captions, sentences and phrases of the text. Once again each indexing word is automatically brought to the central position and alphabetized.

The 'Key Word Out of Context' (KWOC) method of indexing is an extension of the above principle, but it has a better subject grouping approach—bringing like things together—and necessarily involves a certain amount of initial broad manual indexing. An example of a publication employing the use of KWOC is *International Aerospace Abstracts*, published by the American Institute of Aeronautics and Astronautics. This publication uses 'see' and 'see also' references throughout the text. KWOC used in conjunction with NOC (Notice of Contents) can produce a very effective index with multiple access points, although much more work is involved before the index entry can be punched into tape for the computer.

Conclusion

To conclude this paper let us now consider the fundamental problem of whether internal abstracting is in fact necessary. Can we do without it now or in the foreseeable future?

The opinion has been expressed on many occasions that abstracting is a waste of time and effort—why not just buy more copies of the periodicals concerned with the money which would be spent on abstracting services? This would tide one over and bridge the gap between the publication of the original article and its recording in commercial abstracting publications.

In answer to this, I think we must bear in mind the following points:

a Speed of communication is of major importance and this would be limited by the inadequacy and problems of periodical circulation systems.

b Scientific and technical literature is extremely prolific. Could we really afford numerous copies of every important journal?

c The purchase of numerous copies of a journal would be most wasteful and extravagant, especially when information contained therein will soon lose most of its topicality.

d The time taken by the engineer to scan dozens of technical journals each week must be set against the time required to scan the relevant section of the abstracts journal.

e Dr Bradford's 'Law of Scattering' implies that only a third, approximately, of the articles relevant to a given subject field are published in journals relating specifically to that field. In other words, any engineer who concentrates solely on the journals which are acknowledged as being special to his particular interests will miss two-thirds of the total number of articles published. It is therefore dangerous to assume that a handful of journals will keep any engineer up to date in recent developments, even in a very limited subject field.

From these points it would appear that internal abstracting is essential to the progress of industrial development within any organization.

Will this always be the case? Shall we ever see the time when computers and retrieval machines will deal solely with micro-reductions of original articles, and engineers will be trained to use the computer each week for the retrieval of the information they need to keep abreast of current developments? Although recent trends may indicate this, I doubt if it will be the case for some time to come—many problems have yet to be solved. The 'information explosion' alone is a serious situation and, if output were to continue to double every fifteen years, as is now estimated, can we assume that computers will advance as rapidly? Will not the human element always be required to edit information before it is fed into the machines? The face of abstracting may change but the basic principles will be with us for as long as the human mind is required to harness information to the computer.

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WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Rumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

TRANSLATIONS FROM TURKISH. All subjects. F. P. Scott, 4 Uphill Grove, Mill Hill, London NW7.

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Appointments vacant

A CHARTERED LIBRARIAN is required by a large specialist engineering library to be responsible for general routines, including cataloguing, classification and indexing. Experience in modern industrial library practices, especially information storage and retrieval systems, would be an advantage. Knowledge of at least one European language and an interest in science and technology is desirable. Excellent working conditions, with good prospects and a first-class pension scheme. Apply in writing to the Secretary, Production Engineering Research Association, Melton Mowbray, Leics. (I.1828/56), giving full details of salary, qualifications and experience.

The Institution of Production Engineers requires a Library Assistant for work in its Library and Information Service Department. The person appointed will be an addition to the present staff of three. The appointment would suit a newly qualified Chartered Librarian or a nearly qualified student Librarian who wishes to gain experience of technical library and information work. Some free time is allowed to students who are attending appropriate vocational courses. Working hours are 8.45 a.m. to 5 p.m., Monday to Friday, but staff are asked to work outside these limits should it be necessary. Three weeks' annual holiday with pay after first year's service. Minimum starting salary £850 p.a. plus 15*s* p.w. luncheon vouchers. A pension scheme is in operation for staff within certain age limits. Applications marked 'Confidential' should be addressed to the Librarian, Institution of Production Engineers, 10 Chesterfield Street, Mayfair, London W1.

LEICESTERSHIRE. LOUGHBOROUGH COLLEGE OF FURTHER EDUCATION. Principal: F. Lester, B.Sc., Ph.D., F.R.I.C. SCHOOL OF LIBRARIANSHIP. With the continued expansion of the School and with the move into new buildings in September of this year with purpose-built accommodation to cover the widening range of Library studies, applications are invited from suitably qualified Librarians for the following appointments: 1. SENIOR LECTURER; and 2, 3. Two posts of LECTURER with experience in the field of scientific or industrial librarianship. The successful applicants will be required to assume duties on 1st September 1966. Salaries will be in accordance with the Burnham scales for teachers in establishments for Further Education, viz.: Senior Lecturer: £2,140–£2,380; Lecturer: £1,875–£2,140. Further particulars may be obtained from the Principal, College of Further Education, Greenclose Lane, Loughborough, Leicestershire, to whom completed applications should be returned as soon as possible.

LORD CHANCELLOR'S DEPARTMENT LAW COMMISSION LIBRARY LIBRARIAN (GRADE III).
POST for man or woman aged at least 30 who holds an approved postgraduate university diploma in librarianship or has passed the Registration Examination, or the 1964 or subsequent Part II (Final) Examination, of the Library Association, to take charge of a newly established library and to be responsible for future substantial development. Applicants should be thoroughly conversant with modern methods of organizing and exploiting all kinds of library materials. Experience of work in a law

library or in one which includes law books, or of handling legal papers an advantage.
SALARY (Inner London): £1,659–£1,959. Non-contributory pension. Promotion prospects.
WRITE (preferably by postcard) to Civil Service Commission, Savile Row, London W1, for application form, quoting 6425/66. Closing date 29th June 1966.

THE UNIVERSITY OF SHEFFIELD

DEPARTMENT of PHYSIOLOGY and POSTGRADUATE SCHOOL of LIBRARIANSHIP
BIOMEDICAL
INFORMATION PROJECT

Required to develop, operate and evaluate a specialized information centre, in association with the above departments and supported by the Office for Scientific and Technical Information. (1) A Project Leader. The candidate would be expected to be experienced in information work and/or any biological discipline. Salary within the University Lecturer range £1,470–£2,630 according to experience and qualifications. (2) An information assistant in salary range £800–£1,200. The project is initially for a three-year period and, during the period of evaluation, would give scope for research in information techniques. For further details write to the Registrar, The University, Sheffield 10, to whom applications should be sent by 6th July 1966.

WATER POLLUTION RESEARCH LABORATORY, Stevenage, Herts. ASSISTANT EXPERIMENTAL OFFICER /EXPERIMENTAL OFFICER to work as Abstractor in connection with preparation of 'Water Pollution Abstracts'; duties include abstracting scientific and technical literature, indexing, and proof reading. QUALIFICATIONS: Degree, Dip.Tech., H.N.C., or equivalent in appropriate subject. Under 22, minimum qualification is two G.C.E. 'A' levels in Science and/or Maths. subjects. Scientific training to degree standard preferred. Ability to write clear and concise English and knowledge of a foreign language an advantage. SALARY: A.E.O. £568 (at 18)—£803 (at 22)—£1,017 (at 2[illegible] or over) —£1,243; E.O. (minimum age 26) £1,365–£1,734. Prospect of permanent pensionable appointment. Housing may be available. APPLICATION FORM from the Director at the above address quoting E'AM/050. Closing date 4th July 1966.

For sale

Journals of the Royal Aeronautical Society, January 1948–December 1959. Journals of the Institution of Mechanical Engineers and Chartered Mechanical Engineers, January 1951–December 1959. Please send offers to Box No. 866, Aslib.

Staff for Aslib's expanding Consultancy Services

Between now and the end of 1966 Aslib proposes to appoint a small number of CONSULTANTS and RESEARCH ASSISTANTS for training in consultancy.

Preliminary applications or inquiries are invited, in confidence and without obligation, from special librarians, information scientists and others who would like their names to be taken into consideration as the vacancies arise.

The work of the consulting service is essentially to advise on, to plan, and often to initiate the application of existing knowledge and expertise, and new knowledge derived from research, to the tasks and problems of those who come to Aslib for assistance; to seek out opportunities for consultancy service; to assess needs and exercise judgment; to prepare plans and estimates, to negotiate with clients, and to carry through the work in a businesslike manner to a satisfactory conclusion.

The consulting service covers a wide range, from the minutiae of special library operations to the design of integrated library systems, from manual punched cards to fully mechanized systems. Common tasks include 'finding out what users need', reorganizing existing libraries and planning new ones, devising I-R and S.D.I. systems and handling the varied problems associated with classification, indexing and abstracting.

Consultancy and research go together. Consultants form part of the research staff, drawing on and contributing to the work of their colleagues, receiving any necessary training in a research atmosphere.

Vacancies are anticipated at several levels, with salaries roughly comparable with those of the Scientific Civil Service. Those interested are invited to send confidentially a brief résumé of their education and experience to the Director, Aslib, 3 Belgrave Square, London SW1

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Librarian Class 1 $A3,260–4,500
Librarian Class 2 $A4,730–5,420 (Canberra only)
Library Officer Grade 1 $A2,920–3,370
Library Officer Grade 2 $A3,520–3,970 (Canberra only)
(Salaries for women are $A402 less than the rates above.)

Qualifications:
Librarian: Appropriate University Degree *plus* (*a*) Parts I and II of the Professional Examination of the Library Association or (*b*) other post-graduate qualifications giving exemption from these examinations.

Library Officer: Matriculation at a United Kingdom University *plus* Parts I and II of the Professional Examination of The Library Association.

Travel:
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Application form and further details of vacancies may be obtained from the Recruitment Officer, Public Service Board, Australia House, Strand, W.C.2. Phone Temple Bar 2435, Ext. 461.

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ASSISTANT LIBRARIAN

Applications are invited from candidates who should be Associates of the Library Association and have experience in scientific, technical or reference libraries.

The Assistant Librarian will take a full share in the administration and development of the Library, which covers a wide range of science and technology, with an emphasis on engineering, chemistry, physics, and biochemistry. A co-ordinate indexing system is being installed, and the introduction of further practical new techniques is encouraged.

Salary will depend upon experience and qualifications, and there is a generous contributory pension scheme, five-day week, restaurant facilities, sports and social club, etc.

Brief written details, in the first instance, to:

Mr. N. R. Page (Administration), Research & Development Establishment, British-American Tobacco Co. Ltd., Regent's Park Road, Southampton.

The Wellcome Research Laboratories

TECHNICAL LIBRARIAN

A Technical Librarian is required by the Library and Information Services Department which deals with the circulation of some 500 periodicals and the issue of daily information bulletins to some 200 graduates and senior technicians.

The successful applicant will be required to manage one of two technical libraries serving chemical and biological research laboratories and to co-operate with the Information Section in supplying information on all aspects of medical and veterinary research.

Please apply, quoting reference PR.224, to the **Senior Personnel Officer, The Wellcome Research Laboratories, Langley Court, BECKENHAM, Kent.**

Documentation Deputy Editor

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Qualifications: The successful applicant should preferably be a Fellow or Associate of the Library Association, with experience in information and reference work. A knowledge of languages, particularly German and French, an advantage.

Applications in confidence, stating qualifications, experience and salary required, to the Group Personnel Manager, Robert Maxwell & Co., Ltd., Headington Hill Hall, Oxford.

RICS
INFORMATION SERVICES

LIBRARIAN

Applications are invited from chartered librarians for the post of librarian at the Royal Institution of Chartered Surveyors. The Institution's information and library services are being developed progressively and the librarian, who will be responsible to the Information Officer, is expected to play an important part in this development. Candidates should have experience with modern library techniques and an interest in faceted classification schemes. Much of the material in the library is in the subject fields of land economics, land law, building economics and building technology; knowledge of one or more of these subject fields would therefore be an advantage. Salary: in the region of £1,400 according to age and experience. Age: about 25. Applications to: **Staff Secretary, Royal Institution of Chartered Surveyors, 12 Great George Street, Parliament Square, S.W.1.**

TECHNICAL LIBRARIAN

Unilever's Research Laboratory at Colworth House, Bedfordshire, invites applications for the new appointment of a Technical Librarian to take charge of the research library, and to supervise the work of three assistants. The library covers a wide range of science and technology concerning human and animal nutrition, including 500 current periodicals and our own research report files. The library is part of the Information Section which is now expanding in conjunction with the expansion of the Laboratory. The Technical Librarian will take a full share in the planning and equipping of new library accommodation and in the expansion of the library services.

Candidates should be qualified male librarians with a science or technical background and, preferably, experience in a technical library. Salary will be in the range applicable to Science graduates with recognition of experience.

*Write for an application form to the Staff Officer (Reference: FRR/*284).

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ASLIB PROCEEDINGS

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Volume 18 **July 1966** **Number 7**

ASLIB CALENDAR 1966

September

TUE.13.	Evening meeting at Aslib. 5 for 5.30 p.m. 'Information transfer: an investigation of user assessment of relevance', by Alan M. Rees.
MON.19 – SAT.24.	32nd FID Conference. The Hague.
SUN.25 – WED.28.	40th Annual Conference at Scheveningen (The Hague).

October

THUR.11.	Transport Group visit to G.P.O. Railway Sorting Office.
MON.17–THUR.27.	Senior introductory course to special library and information work.
MON.24 – WED.26.	Chemical Group course. See paragraph below.
WED.26.	Evening meeting at Aslib. 5 for 5.30 p.m. 'The mechanization of serial records, with particular reference to subscription control', by Martin Scoones.
MON.31 – FRI.4.	Course on abstracting and co-ordinate indexing.

November

MON.7.	Course on principles of information system design and planning.
TUE.8.	Course on principles of thesaurus development.
WED.23.	Evening meeting at Aslib. 5 for 5.30 p.m. 'Copyright', by G. Woledge.

December

WED.21.	Members' Christmas Party.

1967

April

FRI.14 – SUN.16.	Transport Group conference at Leicester University.

May

MON.29 – WED.31.	Chemical Group Conference at Attingham, near Shrewsbury. See paragraph below.

October

MON.9 – THUR.12.	41st Annual Conference at Harrogate.

Chemical Group Conference

The Chemical Group will be holding a conference from 29th to 31st May 1967 at Attingham Park, near Shrewsbury. Papers will be presented on agricultural chemicals, pharmaceuticals, and plastics, in relation to the additional services these expanding fields will need from information scientists and librarians. There will also be a visit to the Information Division of the Rubber and Plastics Research Association.

Further details may be obtained from Mr B. T. Stern, The Laboratories, BIP Chemicals Ltd, Tat Bank Road, Oldbury, Birmingham.

Basic Chemistry for Non-Chemists

The Chemical Group has arranged a course of lectures to be given by Mr L. W. Chubb at the Industrial Chemicals Laboratory (Egham) of Shell Research Ltd, on 24th–26th October. Mr Chubb's course is designed to introduce non-chemists to chemical nomenclature, *IUPAC* terminology, etc., and has previously been available to members of the Shell Organization only. It is hoped that this course will be repeated and/or published as a booklet.

Further details may be obtained from Mr B. T. Stern, The Laboratories, BIP Chemicals Ltd, Tat Bank Road, Oldbury, Birmingham.

OSTI Grant for Training Study

The Office for Scientific and Technical Information has recently placed a contract of up to £5,210 with the Postgraduate School of Librarianship at Sheffield University for a study lasting eighteen months of the form and contents of education and training required for work in scientific and technological libraries and information departments.

The need for this study in depth arises from OSTI's national survey of staff employed on information work, the final results of which will be published this September in the *Journal of Documentation.* In the first stage of the study, a close examination will be made of the types of work now being carried out in special libraries and information departments and the background of people engaged on such work. The second stage will build up a picture of the various grades of staff, the types of knowledge required to operate present services and the additional knowledge needed to improve and expand these services in the national interest. The aims of the final stage will be to translate these requirements into terms of education and training for all levels, i.e. the content, duration, standard and general character of the various courses which will be needed. The intention is that all these activities should help OSTI to evolve an integrated policy for education and training in information work.

The study will be carried out under the direction of Mr W. L. Saunders, the Director of the School, who will approach directly those people and organizations from whom he feels it is important to obtain evidence. However, he will welcome comments and observations direct from any interested person or institution. Mr Saunders' address is: Postgraduate School of Librarianship, The University, Sheffield, 10.

INSPEL

The first issue of *INSPEL*, the official organ of the Special Libraries Section of the International Federation of Library Associations, has appeared, dated April 1966. This bulletin, which includes papers, reports, news items, book notices and reviews of interest to special librarians throughout the world, is published in three languages, English, French and Russian, with abstracts, wherever possible, in the two other languages.

The editor is Mme Irena Morsztynkiewicz, *INSPEL*, Polish Library Association, Konopczynskiego 5/7, Warsaw, Poland.

The subscription is $4.00 a year. Publication is quarterly. Orders should be addressed to Dr K. A. Baer, 1625 Street, NW, Washington, DC 20036.

FID publications

FID has issued three new publications: *Statement on a new FID programme to meet changing information patterns* (FID 404); *Report on the activities of FID in* 1965 (FID 393); and *FID Yearbook* 1966 (FID 391).

The *Statement* gives a brief résumé of current trends in information activities and lays some emphasis on the necessity for international co-operation and the role of FID in helping to promote the development of international co-operative programmes.

The *Report* is a comprehensive summary of progress on FID's various projects, new membership, publications and finances in 1965.

The *Yearbook* contains full information on the members, officers, and committees of FID for 1966.

Copies of all these publications are available in the Aslib library.

Chemical Society Publications Research

The Chemical Society has recently created a Publications Research and Development Committee. This is intended to be a Senior Committee of the Society to formulate policy and plans for the development of publications and services in the publications field. It will be responsible for research into and development of new publications and services, and will evaluate the impact of the results of related outside work on the Society's activities.

The Committee will also act as a channel of communication with other organisations undertaking similar work and in particular will be responsible for relations with the Chemical Abstracts Service.

At the first meeting of the Committee held on 21st April plans were discussed for the establishment of the Chemical Society Research Unit in Information Retrieval.

Course in Information Work at Liverpool

The School of Librarianship at the Liverpool College of Commerce will be holding a three-day course entitled 'Information work today', from Wednesday 14th to Friday 16th September. The course is intended mainly for scientists, technologists and librarians who have recently begun to take part in information work. Anyone wishing to attend should write to the School of Librarianship, Liverpool College of Commerce, Tithebarn Street, Liverpool 2.

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Deputy Librarian, University of Newcastle upon Tyne

Evening Meeting, London, Thursday 21st April 1966

WE all know by now about the information explosion, namely that there is too much uncontrolled knowledge floating around, and that by the end of the century an overpopulated world will be submerged under a mass of paper, film, magnetic tape, discs, drums, crystals, or whatever other vehicle for information has been discovered by then. What has not been pointed out, so far as I know, is that the literature on the information explosion is expanding at an even faster rate than the information which is exploding, so that by the year 2000 the bulk of the literature is likely to consist of literature on methods of coping with itself. Having made this alarming prophecy, I must now do my bit towards fulfilling it.

It has never been the tradition of university librarians to go much beyond the provision of the material members of the university are believed to require. I do not want to discuss here the principles on which such provision should be made,[1] but to consider how far and in what ways university libraries can meet the information needs of the research worker by the organization of the material they possess and by providing access to all material, whether or not they possess it.

About our researchers we know very little; studies have been carried out into the information uses of scientists, but few go much below the surface of the matter. It is interesting and useful to discover how scientists obtain their references, and how they use abstracting tools, but what we really want to know is how the process of information transfer operates. Until there is a substantial body of research blending communication theory, information theory and learning theory, we must remain very much in the dark. Pending this research, however, there is still quite a lot that can be said, and something that can be done.

First, how should library material be arranged to suit the researcher? There is little doubt that researchers would like all the material in their own field (known as 'my books') brought together. This attitude is exemplified (like some of the other ideas I shall consider) in a recent article by Dr R. G. Andry,[2] where he suggests a 'criminology corner' in a library. What precisely this would contain he does not define, nor does he say whether he would object to criminal law corners, psychology corners, and sociology corners, which would all contain much material of relevance to the criminologist. (Perhaps he envisages the whole library as a collection of corners, which would set new problems for the architect). It is clearly unrealistic to gather together all the material on a subject, since no subject has clearly defined boundaries which separate it from all other subjects; an NLL survey showed that of some 8,000 requests received by the library, about half were for articles on subjects marginal to or outside the special field of the requester. In any case periodicals cannot be torn to bits and scattered according to the subjects of their articles. There is a half-way solution: the abandonment of a recognized general system of classification for arrangement by the subjects actually taught in the university. This is tempting, because existing general schemes are so unsatisfactory, not only in themselves but because they often conflict violently with the needs of the university. (No psychologist or geographer can really feel very happy with the Library of Congress Classification.) Nevertheless, while a general classification scheme is almost bound to be based on assumptions which become outmoded sooner or later, a scheme developed for a particular institution at a particular time can be overthrown by the reconstruction of degree courses, the creation of new courses which grow from the fringes of existing ones, and even by a new professor with a different slant, who may, for example, want to pull out large quantities of physics books for his electronics section. The laudable attempt of librarians to adapt their libraries to actual needs may result at best in a temporary and constantly changing scheme, and at worst in a series of internecine battles between professors.

It is, or will become, possible to analyse the use of books by readers in such a way that they can be arranged in accordance not with any established classification nor with university curricula, but with the actual use made of them, so that, for example, the econometrician has access to a section which contains the books econometricians use, provided that they are not used more by other disciplines. This would be a useful exercise which might well overthrow many of the accepted principles of classification, but it has the disadvantage that it would have to be constantly adapted to keep pace with changing use. There is a more fundamental snag. It may be very important that researchers should be brought into contact with books they do not think of using, since such books may contain or stimulate ideas which will illuminate and advance their creative thought more than any amount of narrow reading: the tangential fact or idea may be more important than the central one. Many major advances in science have been made by the fusion of two apparently disparate ideas in one mind. Koestler makes much of this in *The act of creation.*[3] If this is so, a bad classification may be better than a good one and a perfect one (if it existed) worst of all. Until we know what part browsing and serendipity play in research and creative processes we cannot attempt to answer this question. Meanwhile we are probably not so badly off with our classification systems as we often think—*provided* that we use them only for shelf-arrangement.

Many of our troubles are due to the fact that we have tried to make the same classification serve the purposes both of arranging books on shelves and of subject retrieval, with the result that it serves neither purpose properly: it is too complex and too long-winded in its notation for shelf-arrangement, and not nearly subtle enough for retrieval. Subject retrieval and browsing are two quite separate things, needing quite different approaches.

Somehow, then, university libraries must provide proper subject access to their material. It is simply not good enough to point readers (if they think of asking) to specialist bibliographies. They probably want first to know what the library itself has on a subject, and have a right to expect to find out quickly. Shelf-arrangement, which will probably have to stay much as it is anyway for purely practical reasons, must be supplemented by effective documentary methods. At the most elementary level each department could be supplied with annotated lists of class numbers at which they would be likely to find relevant material; it is astonishing how little readers look beyond their own sections. Even this small service is received with astonished appreciation. Detailed and specific alphabetical indexes to the classification, tailor-made to the needs of individual departments, could also be provided.

But this is all extra work for the library staff, and it does not help the researcher who wants material on a specific topic. What is needed is a system which can be built into the ordinary routine of processing books. Descriptors, perhaps three to five for each book, could be added to catalogue entries to serve as the basis for a co-ordinate index. Or a classified index could be constructed, using not the scheme for shelf-arrangement but a more sophisticated scheme, which would, as it were, be superimposed on the shelf scheme. Faceted classifications, which in their present form are hardly suitable for putting on the backs of books and therefore unlikely to be used for a shelf classification, could come into their own. The main snag with classified indexes is that if they are subtle enough to provide specific subject access they are unlikely to be readily intelligible to the ordinary customer, who finds difficulty enough with simple classifications like Dewey and Congress; often his alphabet is a bit shaky too, but at least an alphabetical index presents him with a more familiar problem. Any index of this type could, of course, be produced by mechanical methods, and if necessary printed out as a whole or by subject groups. Indeed, the printed alphabetical index to each subject field (produced by incorporating into each entry as it is made a subject coding), which can be made available in as many copies and in as many places as required, is a very tempting solution.

As Dr Dolby will explain, at least some of the required indexes, whether alphabetical or classified, could be produced mechanically from the information in existing catalogue entries. This possibility could revolutionize subject access to books in university libraries, not only by providing indexes which never existed before but by providing them in a much more usable form. For, let us be honest about this, the card cabinets which adorn our catalogue halls, so far from being keys to the library's contents, are to most users more like a formidable portcullis which they prefer to circumvent by swimming the moat and gaining direct access to the castle. For a sum which is rarely less than £10,000 a year we produce and maintain a vast repository of mysterious lore that is all but useless to the researcher with an information problem. Before we devote too much time to explaining the catalogue to readers we should explore ways in which we could make it more self-explanatory.

But even when we have provided subject access to our books, we are still not helping our researcher very much. If he wants a book at all it is probably a volume of conference proceedings, or in a subject marginal to his own speciality;

more likely he wants to find a periodical article or a report. If a library is buying, say, 10,000 books a year and subscribing to 3,000 periodicals, the number of *items* received each year will total around 320,000—300,000 articles in periodicals, plus 10,000 books, plus 10,000 individual contributions in symposia and collections of various kinds. To 310,000 of these items no direct subject access is provided at all. Ordinary cataloguing or indexing, however abbreviated, is out of the question for such a large number of items. Indexing and abstracting journals are uncertain in coverage, variable in quality and style of indexing (so that, having found, say, in a volume of *Physics Abstracts* that 'ellipsometry' is under one heading, there is no guarantee whatever that it will be under the same heading in the adjacent volumes, still less in other abstracting journals), and usually rather slow to appear (an article is usually abstracted at about the time we have sent off the relevant volume to the binder). 'Current awareness' services do not solve the problem of searching for literature published on a subject in the last year or so. (In spite of this, holdings by university libraries of abstracting journals are hardly ever as generous as they should be).

It is not even possible for the library to index articles selectively, for to do so would require not only contact with every single researcher but anticipation of every future piece of research. And although research in universities does tend to follow definite lines, the number of different lines is very large and liable to change constantly, as a project is concluded or a professor goes off to another institution, taking with him his line of research with the other researchers hanging on to it. Unlike industrial establishments, where the nature of the concern sets ultimate limits to research, there is effectively nothing to circumscribe the potential range of interests.

One theoretical possibility would be a form of SDI with every researcher filling in his 'profile' and the library finding articles to match it. This is not an operation which any university library could seriously contemplate tackling on the scale required by manual methods; and machine methods require that all the information be sorted in a computer file, so that we are faced with the task of putting it there—and we are back where we started.

There seem to be two main ways in which the problem could be tackled. The first requires no advances in mechanization, and is an immediately practicable, if not a complete, solution. Every research team in the university could have its own 'information officer', whose job it would be to have intimate and expert knowledge of all the research being done, and to search the periodical literature as it was issued. Some research assistants and technicians are already performing this function in an informal and partial way, and in many cases they have become rather proficient at it. This practice could be put on a firm footing and established as a recognized procedure, carried out by appropriately named personnel working in close co-operation with both the department and the library, who would share financial responsibility for them. (Their exact status, qualifications and salaries would have to be carefully established). Incidentally this would help to overcome one of the present weaknesses, which is that liaison between the library and science departments tends to be rather poor; often there is mutual misunderstanding, and sometimes strained relations. I have no doubt that contact of the kind envisaged would produce many ways of co-operation which would result in better libraries and more satisfied departments; for example, the library could help with the current awareness problem in a small way by supplying to departmental information officers xerographic copies of contents pages of periodicals as they came in.

There would be many advantages to be gained from such an arrangement. Unless the library staff is nearly as big as the teaching staff it cannot possibly cater for all specialized subject needs, as Dr Andry seems to envisage.[2] Fortunately this is not necessary, since most reference needs could be met by staff who between them covered the main fields of knowledge; every university library could have, for example, a physical scientist, a life scientist, an applied scientist, a social scientist, and so on. But although a sociologist, say, could help with the vast majority of Dr Andry's criminological inquiries, he might not have the knowledge to satisfy an econometrician fully. With an information officer providing the necessary link, however, it should be possible to provide an answer to anything that is not unanswerable from the library's resources, and also to offer the full personalized service that Dr Andry would like.

Departmental information officers, or whatever they were called, would also be able to help with courses in the use of the literature for research students. There have been numerous suggestions in recent years that libraries should do more in this direction,[4] and the NLL has provided the stimulus and the initial training to enable several libraries to start them. But if they are done properly, with small enough groups for long enough periods, the work and staff involved are very large. I am convinced that the library should play the major part in organizing and running such courses, but ancillary help from individuals who would be in a position to maintain continuing contact with research students would certainly not come amiss.

I should say here that I regard the instruction of researchers in literature searching as a temporary expedient. It has, I know, been generally accepted that literature searching is an essential part of a research student's training, and that he should not therefore be spoon-fed. This is presumably on the assumption that he will have to dig out his own references all his life, or that searching is somehow good for him. The former assumption at any rate is doubtful now, and may become completely invalid within a few years. I cannot see why research students should search for their own references if they can find someone else to do it for them, any more than that they should necessarily make their own slide rules or darn their own socks. In any case, not all researchers are students; and surely staff should not spend valuable time in what should be, at least in its initial stages, a routine task. And even if searching is good for people, that is no reason why libraries should not provide every aid to it that they possibly can.

One would then aim at a fully developed reference and advisory service for all subjects in the university library—something we are a long way from having at present—supplemented by a network of information officers in every department in which research was carried on. There could be one final advantage in such an arrangement: departmental libraries of any size would become less necessary, and if they existed it would not matter quite so much. However, this is an aspect best left unexplored on this occasion.

The second main way of satisfying the information needs of researchers would be by means of nationally, or perhaps internationally organized indexing services. Even if university libraries could index their periodicals, they should not attempt to, because the duplication of effort would be colossal. What is needed is a central computer file, whether with complete coverage or divided by broad subject group like MEDLARS, which could be searched for the answers to individual queries. Now searching MEDLARS is likely to be an expensive operation, sometimes taking longer (as well as costing vastly more) than looking in *Index Medicus*; and by either method a list of references is produced, only a portion of which will be immediately accessible. This is highly desirable, but until we have provided means of immediate access to everything, researchers will still wish to know first what their own library has on the subject. So what is really needed is a regularly issued subject index of the library's own holdings, printed out from the central computer tape, in conjunction with a tape recording the periodicals held by each library. This is clearly feasible already. It is presumably mainly a question of time before it becomes an actuality, and of cost when it does.

Either of these two suggestions, if implemented, could radically improve our information services; together—and they are not alternatives, but complementary systems—they could transform them. The optimum balance between personal reference services and documentary services is not a matter of immediate importance. I do, however, believe that neither must be used to cover up the deficiencies of the other; we should not excuse an absence of expert personal service by pointing clients to a battery of indexes printed by computer, nor pretend we do not need better retrieval devices because we are able to offer personal help. Indeed, as retrieval tools grow in number and complexity personal help becomes not less but more necessary. Although every effort must be made to see that these tools are not only effective but usable, it may be that some of the devices with the greatest potential cannot attain it without the help of an expert intermediary. Moreover, libraries must not only be useful but must also be seen to be useful, and whether they are so seen depends to a great extent on the library staff and their ability to establish good relations with clients.

No one reference service, however good, can hope to answer all the inquiries asked of it, especially if they are not for published literature but for particular pieces of information, perhaps from the frontiers of research. It would be one of the roles of the national reference and retrieval system hinted at earlier to go beyond published material and act as a referral centre, directing inquiries which could not be answered by individual university libraries or from its own resources to specialized sources, where active work and research was being done in the subject, and which would therefore be equipped to give completely up-to-date information or even expert advice.

Finally, translating services, which are often a prominent feature of an industrial information service, are not usually provided within a university, except sometimes on an informal basis. Here the library could do little but act as an agency, obtaining translations where they exist, and, where they do not, operating as a centre which would bring together translators and users. Most universities have a certain number of foreign students who would be glad to earn a pound or two translating or helping to translate material in their own or allied subjects, and university towns can usually produce several more potential translators. It is just a matter of finding them—and, more difficult, of keeping track of them, for they are necessarily a floating population, a supply which constantly needs to be replenished.

It is a sad truth that few researchers turn automatically to university libraries with their information problems. If by any chance they do, and obtain satisfaction, they may find it hard to conceal their surprise. We have failed sadly to put ourselves across; there is plenty of evidence of this (Margaret Slater[5] has provided some recently), and it is pretty damning. Either we cannot give a proper service, or we are keeping quiet about it. It may no longer be enough to wait for readers to come to us; we may need to reach out to them if they are to come at all.

I have argued that for several aspects of information service university libraries must be dependent on a national system. As well as doing what we can within our own institutions, therefore, we must press for a full-blown national service. I do not want to discuss here what form such a system should take, only to emphasize that without it university libraries cannot attain anything like their potential even in the exploitation of their own resources.

I have taken for granted throughout that university libraries should seek ways in which they could meet the information needs of the researcher. I hope this is not an assumption which will be seriously challenged. Although there are limits to what can be done, we have a very long way to go before we reach them. That we should move towards them as fast and as far as we possibly can seems to me a matter of the utmost importance, for, if we do not, scientists at any rate may come to regard our libraries, not without justice, as mere undergraduate collections and book museums containing little of relevance to their research, and that little not organized for exploitation. If we do not give researchers the service they need, they will get it from elsewhere, and we shall have an unhappy and wasteful cleavage between libraries on the one hand and 'information centres' on the other. This is already happening in the United States, and is causing much concern to librarians such as Scott Adams.[6] The Hale Committee in 1964 could still endorse the traditional view of the Library as the 'central organ' of the university;[7] if it becomes instead a mere extremity at the mercy of every financial frost, librarians will not be entirely without blame.

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UNIVERSITY LIBRARIES AND THE INFORMATION NEEDS OF THE RESEARCHER

2: A CONSUMER'S VIEW

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A LIBRARY is, or should be, a service centre specializing in the location, storage, acquisition and exposure of information. From the consumer's point of view the emphasis in such a definition is on the words 'service' and 'exposure'. Most libraries score reasonably well from the viewpoint of service. To be sure, it is not impossible to find librarians who are shocked at the thought of a book being removed from their well-organized store and are further devastated when the errant user who has committed that crime compounds the felony by failing to return the item promptly. However, most users would admit that they receive much better service from libraries than they do from many other types of service centres.

Libraries, however, do not score nearly so well on the 'exposure' problem. As Mr Line has pointed out, one cannot solve this problem by more effective shelf arrangement, however desirable such a change might seem. The card catalogue is already too bulky to permit much improvement by rearrangement, and the new acquisitions lists and shelves, although helpful, meet only a small part of the need.

The problem stems, in part, from the fact that *any* request for information is, in some sense, a special request. The request may fit into a general class of requests, such as the class of all questions that can be answered off the cuff by an experienced librarian or the set of all questions that can be answered by reference to the card catalogue or the reference room. However, the essential quality of a request for information emanating from a research worker is that the request is unique. This means that the job of the librarian is, in a very real sense, impossible; he cannot possibly answer every request no matter what his resources. Even if the librarian were able, overnight, so to enhance his facilities as to enable him to answer every question posed in the last thirty years, say, he would still have no assurance that the next request to the library would be answerable.

The librarian, in assembling his store of information, faces the same problems as the dictionary maker, the encyclopedia editor or the compiler of a book of tables: he must determine what information is to be included, what information is to be left out, and how the information is to be displayed, indexed and so forth. If his collection is too small, the user will eventually reject it on the grounds that he wastes too much time searching for information that it does not contain. If the store is too large, locating particular pieces of information may be so time-consuming that the user will stay away except when he knows that this large store is the only store likely to contain the information he needs.

Users tend to operate on a hierarchical principle. At the first level the user will accumulate as many books and documents as he can afford (and store) for use in his own office. At the second level he will use the stores accumulated by his immediate office neighbours—at least those who do not object violently to such a procedure. At the third level he will refer to his seminar library, then to the college library, university library and national library. One of the first things a wise researcher does on settling into a new campus environment is to conduct a survey of these various subcollections in order to determine which sources are most likely to be able to answer which types of requests, so that he will know how to obtain his information expeditiously.

Such a situation means, almost by definition, that the user's demands on the university library will be severe—he will refer to the library only when his more immediate resources have failed to provide the required information. The utility of the library to the user must then be measured strictly in terms of the number of requests the library is able to satisfy and the time taken to satisfy these requests. It is useful in this context to borrow a common term from the computing world. Let us define the time required to satisfy a request as the *turn-around time*. For each user the turn-around time will vary with each request, leading to what we might call the *turn-around time distribution*. The characteristics of this distribution will then provide a measure of the utility of the library to the user. In particular, a user would want to know how many of his requests (of a given kind) would be satisfied within an hour, how many within twenty-four hours, how many within a week, etc.

Now research is a curious business. Anyone who is paid for doing original work must allow his mind to flit about from time to time exploring various aspects of a number of problems. Periodically an idea will have a particular appeal—and there will be a strong urge to try the idea out. This may mean a trip next door to see how a colleague reacts, or a trip to the nearest piece of apparatus for a test, or a trip to the library to obtain information in the form of a check on other work ('Has this been done?') or data for testing purposes. In situations like this the research worker wants fast turn-around time. An hour may be too long; a day almost always *is* too long. Tomorrow, hopefully, will be the source of new ideas, and unless yesterday's idea was particularly appealing the necessity to return to it will serve only to distract from today's work. For spur-of-the-moment requests late delivery of the information is worse than no delivery at all, and it is a wise librarian indeed who has the good sense to discriminate between the casual request that will be of use only if delivered immediately and the more urgent request where the information will still be of utility three months later, should it (Heaven forbid!) require that long to obtain.

Many stray ideas that come across the mind of a research worker die aborning. The library therefore inevitably acts as a filter on the work that is likely to be pursued. (The same may be said, of course, for the entire context in which the research is being done, the availability of the receptive mind, the proper tools, etc.) When a research worker is convinced that a particular piece of information is critical to his work, he will go after it regardless of the difficulty. However, when he is just mulling over a possibility he will not be able to afford the time to press for information that is not readily supplied.

Thus there is a particular importance to be attached to the very short turn-around times for information requests. Let us consider then various ways in which the library can reduce the turn-around time. First, the simplest way to reduce turn-around time is for the library to provide the research worker with more materials for his own office. This can be accomplished by buying or borrowing books for the research worker's use, by producing copies of journal papers that he can keep for later reference, and by providing printed catalogues and/or bibliographies of direct interest to the individual worker.

Second, the library can provide an information service by telephone. There are times, of course, when anyone welcomes a break from the pressure of thinking and willingly wanders over to the library to 'browse'. However, it should be recognized that on-site use of the library facilities is just that—a break—and there are times when a break is sufficiently distracting for the research worker to refuse to take it even if it seems a potentially profitable undertaking. Most university libraries will answer questions over the telephone, though usually with some reluctance. However, few university libraries have given serious thought to providing an information service by telephone as a major activity. Telephone access to the reference room is very appealing to the user—particularly if the reference room staff has fingertip access to a wide variety of catalogues of its own holdings. Further, such a procedure would naturally tend to channel many requests through a single avenue, where they could be recorded for subsequent study of the needs of the library's users, a facility that should appeal to most librarians.

A third possibility for cutting down turn-around time is for the library to make greater use of the new electronic devices in being and coming into being, to enable the user to shortcircuit existing barriers to the information he desires. Although such developments are by far the most exciting, they are also the most costly and, at least for the time being, the least promising. Any experienced computer user knows all too well the full significance of the statement that a computer can only do that which it is programmed to do. Computer programmes take time to prepare and check out. Further, despite years of fantastic claims to the contrary, there is still very little to brag about in the area of linguistic data processing. There is still not an adequate linguistic data processing language at the level of sophistication of the numeric languages ALGOL and FORTRAN. Finally, the cost of maintaining a complete file of, say, the titles of all books in even a medium-sized university library, in a form such that instant access to the file is always possible, is so far beyond the capability of even the largest libraries that we may safely set aside the possibility of direct interrogation of the contents of a library on a continuing basis for some time to come.

All of this is not to say that computers and electronic devices will not be of benefit to librarians and users in the coming decade. Libraries can and will put their catalogues in machine-readable form, thus returning the user to the happy state of having access to reasonably up-to-date printed catalogues. Not only will printed catalogues come into being, but it seems reasonable to predict that with the present rate of advance of computer typesetting it will be economically feasible to distribute printed catalogues to at least certain subsets of the library users so that they can obtain immediate access to some of the information contained in the library. Further, the fantastic sorting capability of the computer will make it possible for the library staff to prepare for the use of its reference section a much larger number of orderings of the catalogue. No longer will the library have to debate whether it can afford a title catalogue as well as an author and subject catalogue. Instead it will have the availability of catalogues by author, title, subject, time, place and class number in various combinations. The availability of such information will not only amplify the efforts of the professional librarian, it will also mean that library clerks will be able to locate poorly defined documents much more rapidly than professional librarians could do in the past. With such power on the other end of the telephone the lot of the user will be happier indeed.

Let us consider then some of the programming problems that library personnel, in collaboration with linguists and computer programmers will have to solve in the coming years to take full advantage of this potential. First it must be recognized that processing of records in the machine is a rather different business from human analysis. For example, when a human inspects a catalogue card he can tell from a glance at the title whether the document is written in a language that he understands. As all library users can do this it is not necessary to indicate explicitly the language of each document in the catalogue entries. However, if the librarian wishes to use the computer to obtain a listing of all the titles in his collection that are written in French, say, he must either supply a specific code for each title prior to the entry of the information into machine-readable form, or he must obtain a programme that is capable of making such determinations with sufficient accuracy. As far as we know, no such programme exists at present, but progress in computational linguistics in the past few years, although meagre, has advanced to a point at which we can reasonably expect a solution to this problem within a year or two. Similar questions arise throughout any study of the problem of keyboarding catalogue entries for subsequent machine processing. Certain information can go into the machine in the same implicit form as it now exists on catalogue cards, and machine programmes will have to be constructed to determine the explicit form of the information for subsequent processing. Other information will have to be coded explicitly prior to the keyboarding operation (perhaps with professional librarians to make the appropriate decisions), because the programming and linguistic sophistication now available to the librarian is not sufficient to make the decisions in the machine automatically. Both programme construction and the use of professional librarians to scan catalogue entries are expensive. Careful collaboration between those who know the library and those who understand the computational problems will be necessary if wise use of existing manpower is to be made.

Another example may serve to put the problem in better perspective. In 1959 Luhn[1] proposed the used of the KWIC index for exposing the information contained in the titles of reports, technical papers and other documents. Although few users really like the format of the KWIC system and fewer still pretend that it is an index in the proper sense of the word, there is no question that the simplicity of the idea (and the programme necessary to implement it) has made this the dominant form of machine indexing, if not the only form that has escaped from the laboratory. Cleverdon, for instance, indicates that he knows of some forty different KWIC programmes. However, there are a number of improvements that should be made in the KWIC system if it is to become more generally useful. First, it should be recognized that the permuted nature of the title is only a simple way of obtaining the sort key, or index entry, and that this format does not have to be maintained in the actual printing of the entries. This user, at least, would much prefer to see entries of the following form:

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POWERFUL, MOST Some rank order test which are
. . . against specific
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than the usual KWIC form:

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ORDER TEST WHICH ARE  MOST POWERFUL  AGAINST
SPECIFIC ALTERNATI/
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To obtain the first form we first need just a bit more programming sophistication, and this has already been accomplished in some applications of KWIC, leading to the term KWOC (for Key Word Out of Context). Secondly we need a bit more sophistication in the linguistic handling to determine whether the entry should occur under MOST POWERFUL with a see reference under POWERFUL, MOST, or conversely. Thirdly, present KWIC programmes use a relatively simple procedure to determine whether a given word is sufficiently important to be indexed or not: a list of non-significant words is maintained in the computer and all other words are automatically declared to be significant. More sophisticated linguistic procedures are available to determine whether a given word is significant in the particular context where it occurs.

Finally, in this same vein, the preferred form of entry shown above is in both upper- and lower-case letters, as opposed to the common form of computer output where only upper-case letters appear. High speed computer printing devices now exist (and are even being used for library applications) with both upper- and lower-case characters. Presumably the number of such devices will grow as it becomes more evident to the computing industry that the automatic processing of linguistic information is likely to be a profitable business. However, at present the librarian should bear in mind that computers have been earning their keep for fifteen years as numeric data processing devices and that thus far linguistic applications are still a very small portion of the business. Thus anyone asking for reasonable print quality must recognize that his application is not the standard one and that he must be prepared to pay more in time and/or money to obtain such extra service.

All developments in this area, be they concerned with linguistics computation or printing processes, will require pressure from the librarians if reasonable progress is to be expected. Not all libraries will be in a financial position to support such activities under the grants they will have available for automating portions of their operations. Librarians as a group, therefore, must work through their various organizations to see that these problems are solved and reported on in sufficient detail, so that programmes can be carried over from one operation to another with a minimum of rework and reprogramming. (For a more detailed discussion of the programming and linguistic problems facing the librarian, see [2]).

From the user's point of view there is a second edge to the computing blade. The computer programmer, faced as he is with a difficult programming task, will naturally ask whether certain 'niceties' of existing library practice cannot be dispensed with in this modern age. If such a question is tackled intelligently it can lead to salutary advances in any system. However, with limited time and resources the tendency to answer all such questions with 'Oh, we can probably do away with that. The users will never know the difference' is strong, perhaps too strong. Further, it is possible to reinforce this approach by the simple expedient of showing half a dozen typical users the results of such a change to see if they do in fact notice the difference. If the question is properly phrased and the users are in their usual hurry, their acquiescence can be assured. However, the librarian who indulges in such manipulations should recognize that he is blatantly abdicating his responsibility to his users by a gross misuse of both sample survey techniques and the nature of computer systems planning. The user may acquiesce at the time, and he may also quietly leave the university a couple of years later because, among other things, he finds that he can obtain much better service at another university library. Despite the recent emergence of the computer as an aid to science and the humanities, the facilities of the library are still an important feature in the overall picture that a university presents to the outside world—particularly to the individuals the university would like to bring within its walls. The librarian who allows the exigencies of computing to cloud his judgment about what constitutes proper service for his users may do his university a severe disservice.

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DISCUSSION

Mr C. F. Cayless (AWRE) said that although a mechanized loan system was operated at Aldermaston, they retained a manual loan file in author order. It would be possible to get a printout of loans daily, but before going to the expense of doing this it was necessary to know whether customers would be prepared to wait at least twenty-four hours before knowing who had the book they wanted. Secondly, although it would be possible in this country before long for university libraries to issue printed catalogues, before doing this we need to know what proportion of users require information rather than specific items. If only a few want information, would not an SDI service be feasible?

On the first point, Dr Dolby said that he personally would have no objection to a system that was incapable of identifying the borrower of books borrowed within the last twenty-four hours.

Mr Line said it might be important to know sooner than this. After all, the book might already have been returned between one printout and the next. As for information inquiries, the first priority was surely to give full 'exposure' to all the information already contained in catalogue entries. SDI in a university required the searching of all periodicals as they arrived, and presumably the machine matching of profiles and documents: in effect, the library would have to index all its articles. An information officer working with departments or research teams seemed a more feasible solution meanwhile.

The Chairman (D. T. Richnell) said that this had already been done at Reading University, where some university departments had their own information officers. It was less satisfactory to second library staff to departments, since their time came to be taken up by secondary tasks.

Dr Dolby said that research workers needed a lot of information on library holdings in a convenient form—like a telephone directory.

Mr Simon Francis (NW Polytechnic) asked whether Dr Dolby's knowledge of libraries arose from a particular interest in them, or whether it was acquired during the course of his education.

Dr Dolby replied that he had been taught to use libraries on a number of occasions at school and college.

Mr P. F. Cole (B.P. Research Centre) felt that we should accept that many users shared to a large extent Dr Dolby's attitude to libraries. In preparing for computerization present practice should be defined. He believed that significant economies could also be made by pruning the library stock before computerizing the catalogue. R. W. Truswell (*Am. Doc.* 16 (1) 1965, p. 20–6) said that at Northwestern University 99 per cent of the demand was satisfied by 25 per cent of the library stock.

Dr Dolby commented that the storage of every character in every book would not be practicable for a while, but the cost of recording the titles would not be overwhelming. One should also not discard the 75 per cent too lightly. The odd request was usually the important one.

The Chairman pointed out that in a library where the bulk of the material was in the humanities, one could probably not identify the little-used 75 per cent.

Dr D. J. Campbell (Pressed Steel) said that one should distinguish between discarding 75 per cent of the stock and simply not including this proportion in a computerized system.

Mr G. N. Broadis (Southampton University) asked whether it would be feasible to convert a library catalogue into machine-readable form by an automatic optical system.

Dr Dolby replied that although optical character readers existed, they were very costly and could read only high-quality type—not typical catalogue cards.

Miss Kathleen Watkins (University College, London) said that at University College Library they had decided after examining the present system that they needed to know the location of borrowed items all the time. Quite half the readers found that the item they required was on loan to a colleague in their department, so that they could go and see it in his room.

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ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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New Periodicals

Inspel: international newsletter of special libraries, vol.1, no.1, April 1966—

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COMMONWEALTH AGRICULTURAL BUREAUX, VACANCY FOR SCIENTIFIC OFFICER, Commonwealth Forestry Bureau, Oxford. The duties include abstracting and classification of technical papers and dealing with inquiries. Applicants should be graduates in forestry or biology (botany or zoology) with an aptitude for languages, or linguists with an interest in biology. Opportunities for further training. Reading knowledge of foreign languages, especially Spanish, German or Slavonic, desirable. Salary in the scale £926–£2,431. Starting salary according to age, qualifications and experience. Two extra increments after two years' satisfactory service for applicants aged 32 or under on appointment. Provision for superannuation. Application forms and full particulars from Director, Commonwealth Forestry Bureau, South Parks Road, Oxford.

RUSSIAN/ENGLISH TRANSLATIONS. Chemistry, electronics, mechanical engineering. Twenty years' experience Government Department. A. De Merindol, 15 Ingelow House, Kensington, W8. WEStern 6788.

ABSTRACTOR required for the British Ship Research Association at its London headquarters. Knowledge of Russian essential. The primary duty will be to prepare abstracts of technical articles and to index them using a co-ordinate indexing system; other work will include literature searches, the preparation of bibliographies, etc. A good technical knowledge, preferably of degree standard or equivalent, and an interest in shipbuilding and marine engineering is required; a working knowledge of languages other than Russian would be an advantage. Ability to grasp the main points of a technical article and to state them in clear concise English is essential. The appointment will be graded as Experimental Officer with a salary range up to £1,850 per annum. Please apply to the Secretary, BSRA, Prince Consort House, 27/29 Albert Embankment, SE1.

DEPARTMENT OF EDUCATION AND SCIENCE, OFFICE FOR SCIENTIFIC AND TECHNICAL INFORMATION, London. SCIENTIFIC OFFICER or SENIOR SCIENTIFIC OFFICER required to help promote the education and training of Scientific and Technical Information staff at all levels and for all types of information work. QUALIFICATIONS: Normally 1st or 2nd class honours degree, Dip.Tech., or equivalent or higher qualification in a natural science or technology but, exceptionally, consideration will be given to a candidate whose main qualification is in a social science, preferably with experience in Experimental Psychology or with additional qualifications in natural science. Successful completion of a post-graduate course in information work and/or practical information experience an advantage. SALARY: S.O. £996–£1,659. S.S.O. (minimum age 26) £1,829–£2,240. Grading and starting salary will depend on age, ability and experience. F.S.S.U. Prospect of permanent pensionable appointment. APPLICATION FORM from Miss M. E. Gummer, Department of Education and Science, Curzon Street, London W1 (telephone: HYDe Park 7070, Ext. 311). Closing date for receipt of applications 15th August 1966.

LIBRARY ASSISTANT. A vacancy exists for a library assistant within the Electrical Development Advisory Division of the Electricity Council at Trafalgar Buildings, Charing Cross, SW1, to help in the operation of a recently formed Industrial Information Centre. Candidates should have some experience in indexing, cataloguing and general library routine, and will be required to assist in the maintenance of punched card information systems. The salary will be within the scale £765–£990/£1,065 per annum inclusive. Applications stating age, present position, salary, qualifications and experience should be forwarded to Mr K. H. Hughes, Assistant Secretary (Establishments), The Electricity Council, 30 Millbank, London SW1. Quote Ref. AP/649.

Forest Products Research Laboratory
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COMMERCIAL INFORMATION ASSISTANT. The preparation of commercial information bulletins for the G.K.N. Group would be the major task. This involves the abstraction of a wide variety of newspapers, trade journals, etc. Previous experience of information work in an engineering context would be valuable. Specific academic qualifications are not sought, but probably a person educated to about degree level would be the most suitable. Please apply to: The Personnel Officer, G.K.N. GROUP RESEARCH LABORATORY, Birmingham New Road, Lanesfield, Wolverhampton.

BRITISH BELTING & ASBESTOS LIMITED require a DEPUTY LIBRARIAN. The successful applicant will be expected to take an active part in the work of an expanding technical and commercial library. Duties include cataloguing, classification, information work, abstracting and staff training. Although preference will be given to chartered librarians, applicants who have passed Part II, or are awaiting examination results, will be considered. Applications, giving details of age, experience and qualifications should be made in writing to: The Employment Officer, British Belting & Asbestos Limited, Cleckheaton, Yorkshire.

NATIONAL INSTITUTE OF AGRICULTURAL ENGINEERING. Applications are invited from Chartered Librarians for the post of Librarian in charge of the technical library at this Institute. A degree or equivalent qualifications in an appropriate subject and some knowledge of languages would be useful. Starting salary £803 (at 22) to £970 (at 25 or over), scale maximum £1,457. Further details and application forms from The Secretary, N.I.A.E., Wrest Park, Silsoe, Bedford.

UNIVERSITY OF ASTON IN BIRMINGHAM. DEPARTMENT OF BIOLOGICAL SCIENCES. Biodeterioration Information and Research Centre RESEARCH ASSISTANT. A vacancy exists in the above Centre for a person with experience of a biological science and/or information science. The work of the Research Assistant involves the collection, handling and dissemination of information concerning the deterioration of materials by organisms. This appointment offers an excellent opportunity for a person of initiative wishing to make a career in scientific information work: the Centre is a rapidly expanding new project, in the Department of Biological Sciences, partially supported by an Office for Scientific and Technical Information grant. Publication of work is encouraged. Salary within the range £680–£1,200 p.a. according to qualifications and experience. Further particulars and forms of application from the Staff Officer, University of Aston in Birmingham, Gosta Green, Birmingham, 4, to whom applications should be forwarded within fourteen days of this advertisement. Please quote: 482/85.

Wanted

URGENTLY WANTED. *Journal of Organic Chemistry*, Vols. 20–22, 1955–7. Good price offered. Librarian, Smith Kline & French Labs. Ltd., Welwyn Garden City, Herts.

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We wish to recruit a librarian, experienced in operating an industrial or technical library, aged 25–40 and preferably with formal qualifications. The task will be to take over an existing grouping of various small libraries and forge them into a progressive information system.

The successful applicant must be able to show evidence of flexibility in approach and in application of new ideas. Familiarity with and experience in co-ordinate indexing would be advantageous.

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SHIPBUILDING GROUP,
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(REFERENCE)

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research laboratory librarian

A librarian/information officer is required for the new Kodak Research Laboratories at Kirkby near Liverpool. These laboratories are designed for essentially synthetic organic chemical research and the successful candidate will be responsible for establishing and maintaining a comprehensive scientific library and information service for the use of the laboratory and other Company Departments on the site.

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Write for application form to:

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Please write for Application Form to:

Manager, Central Staff Services,
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Candidates should be qualified male librarians with a science or technical background and, preferably, experience in a technical library. Salary will be in the range applicable to Science graduates with recognition of experience.

*Write for an application form to the Staff Officer (Reference: FRR/*284).

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Aslib Proc. vol.18 no.8 pp.201-231 London, August 1966

ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 18 **August 1966** **Number 8**

ASLIB CALENDAR 1966

September

TUE.13.	Evening meeting at Aslib. 5 for 5.30 p.m. 'Information transfer: an investigation of user assessment of relevance', by Alan M. Rees. See paragraph below.
MON.19 – SAT.24.	32nd FID Conference. The Hague.
SUN.25 – WED.28.	40th Annual Conference at Scheveningen (The Hague).

October

MON.17–THUR.27.	Senior introductory course to special library and information work.
TUE.18.	Transport Group visit to G.P.O. Railway Sorting Office.
MON.24 – WED.26.	Chemical Group course, Industrial Chemicals Laboratory (Egham), Shell Research Ltd.
WED.26.	Evening meeting at Aslib. 5 for 5.30 p.m. 'The mechanization of serial records, with particular reference to subscription control', by Martin Scoones.
MON.31 – FRI.4.	Course on abstracting and co-ordinate indexing.

November

FRI.4.	Criminology Group, inaugural meeting, Churchill College, Cambridge.
MON.7.	Course on principles of information system design and planning.
TUE.8.	Course on principles of thesaurus development
WED.23.	Evening meeting at Aslib. 5 for 5.30 p.m. 'Copyright', by G. Woledge.

December

WED.21.	Members' Christmas Party.

1967

April

FRI.14 – SUN.16.	Transport Group conference at Leicester University.

May

MON.29 – WED.31.	Chemical Group Conference at Attingham, near Shrewsbury.

October

MON.9–THUR.12.	41st Annual Conference at Harrogate.

Aslib Evening Meeting, September

It is 'in' just now, we are assured, to speak of 'information science', 'information transfer' and 'communication'. 'Documentation' and even 'information retrieval' are 'out'. The shift in terminology reflects a new emphasis and new doubts; retrieval does not necessarily imply communication; delivery of a document does not guarantee its use. Too often, it is felt, we debate the rival merits of classification schemes, subject headings and thesauri, only to neglect the vital problem of how the information is used and what its actual effect is on research and development.

But already the interface between information and research is being explored. In the paper which he will present to the Aslib Evening Meeting on Tuesday 13th September, Mr Alan M. Rees will discuss work currently being undertaken at Western Reserve University on the psychology of the relevance judgment process. Here judgments of relevance are being studied in the context of a simulation of a completed research project in experimental medicine. The variables studied are the judges themselves (taking into account differences in educational background, experience and work), the stage of research at which judgments are made, the document set, and document representations. Mr Rees will present a preliminary analysis and interpretation of the experimental findings and relate this to the general problem of the testing and evaluation of retrieval systems.

Courses on Co-ordinate Indexing

Aslib is once again presenting the Course on Abstracting and Co-ordinate Indexing designed by the Battelle Memorial Institute for the Engineers' Joint Council in America. This is an intensive course designed to enable students to operate the system of co-ordinate indexing adopted by the EJC for use in the publications of its constituent bodies. It is a highly developed system using links and roles, which can be used without complicated equipment, but can also be used in mechanized systems. The course includes a large amount of practical work in addition to lectures. A training manual and other documents are supplied, and no additional reading or preparation is required. The lecturer will again be Mr John C. Costello jr., Director of Information Systems Research at the Battelle Memorial Institute. The course will be held from Monday, 31st October, to Friday, 4th November 1966 at Aslib Headquarters. A full programme of the course is enclosed in this issue. All students must have had either formal education up to degree standard, or considerable experience in either scientific and technical work or a special library or information department. The fee for the course will be fifty guineas. Students wishing to attend the course should apply on the forms enclosed in the programme. Those who cannot show a degree or the qualification of a relevant professional organization should enclose a letter with the form explaining on what grounds they hope to be admitted.

Following the main course Mr Costello will present two supplementary training sessions on related topics. On Monday, 7th November, he will give the session on Principles of Information System Design and Planning, which he gave previously in May 1965. This will be followed on Tuesday, 8th, by a new session on Principles of Thesaurus Construction, Development and Use. A separate leaflet, also enclosed in this issue, gives details of these sessions, and separate application forms are provided for each session. Students must have the same educational qualifications or relevant experience as are required for the main course. The fee for each of these sessions will be nine guineas.

Applications for either the main course or the supplementary sessions *must* reach Aslib by Monday, 3rd October 1966.

Anglo-American Conference on Mechanization of Library Services, Brasenose College, Oxford

From 30th June to 3rd July more than sixty librarians and computer specialists under the chairmanship of Sir Frank Francis discussed the necessity for and the implications of the application of machine methods to large library systems. Although the ten papers presented ranged widely over the field—bibliographical standardization, conversion of existing records, alphabets and character sets, centralized cataloguing, information retrieval—the framework was given by the realized need for the closest collaboration between the main copyright libraries, the British Museum, Oxford and Cambridge among themselves, and in relation to the mechanization projects under way at the Library of Congress.

While no resolutions were taken it was generally agreed that there are dangers in further temporizing, as access methods in large libraries have become patently inadequate. Efficient mechanization depends on agreed conventions in bibliographical description and computer programming—and that implies participation by the British groups in the Project MARC of the Library of Congress.

The Proceedings of this Conference, which are being handled at the British Museum, will provide valuable information for future planning.

Computers in university libraries

Mechanization in university libraries was the subject of the first, four-day summer course organized by the Postgraduate School of Librarianship of the University of Sheffield.

One of the main themes of the course was the reappraisal of the objectives and function of libraries, which the introduction of computers has given rise to. Emphasis was laid on the central role of the catalogue as a finding tool for users and as an inventory of holdings, and on the flexibility of organization which the machine-readable catalogue record offers.

A concrete result of the course was the establishment of user groups with access to similar computing facilities, to co-ordinate exchange of experience. One such group, the ICT Working Party on Library Automation, has been in existence since earlier this year.

Dictionary of Canadian biography, vol. 1, 1000-1700

This is the first volume to be published of a multi-volume dictionary of biography which is being compiled at the University of Toronto under a bequest made specially for this work. The names included are not only those of Canadian nationals, but also those of people who settled in the country, as well as Canadians who achieved distinction abroad.

Each volume is to cover a specific number of years and short essays on the history of the period appear at the beginning. The volume in which a biography is included is determined by the death date of the subject and the contents of each volume are arranged alphabetically with references at the end of each entry.

A French language version of the dictionary is also available.

The *Dictionary of Canadian biography* is published by the Oxford University Press. Volume one costs £5.

Periodical prices

Mrs Irene Veasey of Blackwell's asks us to direct the attention of Aslib members who assisted her in making a survey of periodical prices to an article by her in this month's *Library Association Record,* in which data from the survey are presented.

New home for the Institute of Information Scientists

The Institute of Information Scientists has now acquired a permanent office at 5/7 Russia Row, Cheapside, London EC2. All official correspondence should now be sent to this address.

Special Libraries

Thanks to the co-operation of the Special Libraries Association, who have provided copies of those issues of *Special Libraries* which have long been missing from Aslib's collection, a complete run of this journal is now held in the Library. The bound volumes will be available for reference only, but xerographic copies of individual articles will be supplied on request.

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Professor J. D. Bernal (The University of London)
DES (OSTI) OBSERVER:
A. P. J. Edwards

HANDLING INDUSTRIAL (SCIENTIFIC AND TECHNICAL) CONFIDENTIAL REPORT MATERIAL

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Presented at the Aslib Conference on Handling Confidential Report Material, Wednesday 11th May 1966

Background

THIS paper deals with the report collection of one of the largest Divisions of ICI. Mond Division was formed by the merger of the Alkali and General Chemical Divisions of ICI in January 1964. It is organized into five Product Groups to manufacture a variety of inorganic and organic chemicals on a very large tonnage basis.

The main products are (1) alkalis such as soda ash and other products of the ammonia-soda process, inorganic fillers and water treatment chemicals; chlorine and caustic soda by electrolysis of brine; salt, lime and limestone in various forms; sulphur, fluorine and cyanide derivatives, including acids and salts; metallic sodium and titanium; (2) organic chemicals based mainly on acetylene ethylene and methane, including vinyl and acrylic monomers for the plastics industry, chlorinated and fluorinated hydrocarbons and derivatives, viz. chlorinated solvents such as tri- and perchloroethylene, carbon tetrachloride, methylene and methyl chlorides; fluorocarbon refrigerants and aerosol propellants, and anaesthetics; firefighting agents; chlorinated polymers, waxes and rubbers; the new pyridine-based herbicide, paraquat, and other plant protection products. The Division has a special interest in metal degreasing and heat treatment, and has extensive knowledge of and contacts with a large number of consumer industries and technologies.

The report collection covers all aspects of research, development and manufacture of the above, as well as other exploratory research; in addition it includes material received from other ICI Divisions and Associated Companies.

Also on the Runcorn Site is the Petrochemical and Polymer Laboratory, a central ICI facility carrying out medium and long-range research in the fields of organic chemistry related to ICI's present and future petrochemical interests and the synthesis and evaluation of new polymers. Their documents are included in the report system described.

The Mond collection originates mainly from departments of the Division having technical or techno-commercial interests, particularly from Research, Development, Technical, Operations, Engineering, the Various Works and also from Techno-Commercial and Technical Service Departments. Over a thousand of the staff contribute to or use the collection, and since January 1964 about seven hundred and fifty authors have contributed new reports.

Organization and staffing of report files

There is a geographical problem here because of the widely scattered locations of report users in the Runcorn and Winnington areas, e.g. nine manufacturing works, three Research Laboratories and various offices several miles apart.

The Division Report Centre is a section of the Libraries and Technical Information Group, which forms part of the Research Department. The Report Centre deals with Company as distinct from the *published* information—the latter being handled by the Libraries which are in another building a hundred yards away. This separation poses problems, but is partly deliberate, based on security and use pattern (see below) and space considerations.

Liaison is maintained with other Divisional Information Units and with the ICI Central Technical Information Unit, but it is not proposed to deal today with report handling on a company basis except in so far as this concerns Divisional procedures.

The Mond Report Centre is managed by a senior technical man under whom there are three indexer-searchers (i.e. assistant information officers) one of whom is at graduate level and two at a slightly lower technical level. There are also twelve clerical staff, at three locations. Their duties will become apparent in what follows.

For management of the report centre, and for technical work such as indexing, abstracting and searching, we prefer to employ scientific staff with experience of the Division's interests, often recruited from the research area. The annual budget of the Mond Report Centre and satellite files at present exceeds £20,000 a year, excluding libraries and registries.

The Petrochemical and Polymer Laboratory report files and indexes are separately housed in that Laboratory and are administered, in liaison with Mond Report Centre, by a section of three technical and three clerical staff, which also handles correspondence and provides a technical information service based on library material.

This procedure differs from that in Mond Division where Research Department correspondence and departmental papers are housed separately from the report collection and administered by Library clerical staff.

The important point to note here is that in both cases technical reports and memoranda requiring expert subject analysis and deep indexing are dealt with by trained indexers and kept quite separate from departmental correspondence and papers which require only registry treatment. It is absolutely necessary to make this separation when the documents are issued to ensure proper indexing and retrieval of technical information of permanent value and to simplify scheduled disposal of ephemeral correspondence and papers.

An ICI Central Technical Information Unit (Centek) was formed just over two years ago to act as a co-ordinating body and a link between Division information units, and to facilitate the more effective use of technical information within ICI as a whole. One major function of Centek is to collect indexed references to reports in Divisional collections and to prepare, update and distribute a computer-produced consolidated company index of reports based on a thesaurus of company indexing terms. This scheme is now in operation.

Type of information and documents handled

The Mond report collection totals more than 150,000 documents, and is being added to at the rate of over 3,000 a year.

Types of material received include project and period reports, technical notes and memoranda, committee minutes and papers, company engineering brochures, company pamphlets, data sheets, and internally prepared literature surveys and translations. Material *excluded* is: commercial records, correspondence, personnel records, and *published* reports (e.g. of research associations and government departments, which are given library treatment).

Government secret or classified information is handled by the Report Centre, but will not be dealt with in this paper.

Processing of reports

The *issue* of new reports is not yet completely centralized within the Division, because reports are written, approved, edited, typed and duplicated within Departments. Report covers and circulation lists are, however, prepared by the Report Centre for all documents issued through the Centre. Reports from remote works are often issued locally. When reports are not issued through the Report Centre copies should be, but are not always, sent to the Centre for filing and indexing.

Our first problem is therefore one of building up a complete collection, and this is a matter of persuasion and mutual confidence as between Departmental Heads and the manager of the Report Centre, rather than top level edict. Through experience of subsequent failure to retrieve information lost or buried in departmental files, Heads of Departments usually fall in sooner or later and send their technical documents for filing. (Computer prepared departmental lists, etc. may promote this—they will also save registry work). Meanwhile Report Centre staff get to know where the outlying pockets of information are and delve accordingly in response to inquiries.

Sometimes, of course, failure to retrieve information is due to its not having been properly written up in report form, and, as far as research information is concerned, this is now being tackled by management asking for shorter review-type progress reports plus more prompt writing of project reports, interim notes and memoranda, and data sheets.

Issue of a Research Department project report, note or memorandum requires the author to complete an *issue form*, or 'birth certificate' (see Fig. 1) which provides a convenient means of (1) Controlling the circulation and security category, (2) ensuring that the manuscript is properly approved, typed and checked before issue, and (3) getting the document numbered, stamped and recorded before distribution by the Report Centre.

Notes for guidance of borrowers and ICI regulations on security classification of reports appear on the back of the 'birth certificate'.

We hope that eventually other departments will be persuaded to follow this procedure, but the Division Product Group structure to some extent favours autonomy and works against centralization of services even on a Division basis as well as over ICI as a whole.

The clerical work load involved in the distribution of new reports both within the Division and outside is very considerable as circulation lists may be extensive —often as many as a hundred copies of a single document must be distributed through the central messenger service, with appropriate addressing, sealing, and stamping ('confidential') of envelopes, etc.

The extent to which a report is distributed depends on subject matter, security category, and whether it is for information or action. We try to keep down the amount of paperwork in circulation and to restrict routine distribution in accordance with 'need to know', but on the other hand we do have the responsibility of ensuring adequate communication of recorded technical work at all levels of use from directorate down to experimental officer.

Abstracting is done in the Report Centre. After carefully reading the report an eight- to ten-line abstract is prepared covering both the main theme(s) and subsidiary information considered new or worth recording (e.g. techniques, apparatus, data, preparative methods). The idea is to supplement the title, so as to *indicate* the scope and nature of the document and its level of treatment of the subject, e.g. processes, reactants, products; visits; whether it is experimental, in summary or detail, or theoretical; and whether it contains costs, market information, patents, etc.

Authors' summaries are taken into account, but not relied upon by the abstractors. *Co-ordinate* (i.e. keyword) *indexing* is used, operational experience of this method over five years having been satisfactory. A Batten card (Brisch-Vistem) of 2,500 hole capacity, filed in Visirecord bins, was chosen because it is easy to punch and to read. A simple manual lever or screw punch was used, but we now use a machine-set electrically operated punch. Depth of indexing averages fifteen to twenty keywords for each report and these are displayed on the back of serially filed abstract cards in such a way as to indicate association of terms (see Fig. 2). Rôle indicators have not so far been used in the Mond index because we prefer to rely on secondary screening of abstract cards, but it may be necessary to make limited use of rôles in our proposed mechanized system. Because of its larger chemical vocabulary in the organic and polymer fields, the Petrochemical and Polymer Laboratory report index makes selective use of 5 rôle indicators (see Fig. 3). In Mond Division a satellite uniterm index of specific chemical keywords is used in conjunction with grouped or generic keyword terms in the main co-ordinate index. This device enables us to limit the number of term cards in the main index, based on density of posting. An important feature of both Mond and Petrochemical and Polymer Laboratory indexes is the use of standardized and controlled vocabularies of indexing terms, which are up-dated and printed out by computer. The preparation of these lists and their conversion to a thesaurus structure are proceeding as the collections grow. Vocabularies of earlier indexes were used as a basis. The vocabulary contains at present approximately three thousand terms for a collection of six thousand items. Conventional alphabetical indexes of the modified Kaiser type were used prior to 1960, i.e. for the main bulk of the Mond Collection, which was at that time split into several parts at different locations. One index alone contained three-quarters of a million references to seventy thousand reports covering a period of forty years. Bringing these together to make an integrated collection was no mean task and occupied several months.

Progress (or period) Research reports are indexed separately and simplified procedures are being sought. The use of links (i.e. splitting the document into separately numbered and indexable items) and cutting up and pasting items together to make continuing separately indexed reports on a theme, have been tried. Possibly a book-type index supplement to annual volumes will be adopted. References to authors and to laboratory notebook numbers are included in research progress reports; this helps cross-fertilization in a large Research Department and also obviates indexing of original laboratory notebooks.

Comment might be made here on *standards* of indexing necessary to record adequately the results of research and other technical information. We have a long tradition in this part of ICI of spending relatively *more* effort on the indexing of company information than on the indexing of published literature, whereas in some other Divisions and elsewhere the reverse is the case, particularly for the more competitive industries. Our situation is partly of historical origin, since the Report files originated many years ago as Managing Directors' personal files, and in fact only in recent years were these services integrated with the Libraries. Indexing costs are probably higher because of this approach; the average cost of indexing a report is approximately £1, of which about 15*s* represents technical effort in reading, abstracting and allocating keywords; this figure excludes overheads. For a typical research project report resulting from an average expenditure of £7,000–£10,000, we do not consider our indexing cost too much to pay for speed and certainty of retrieval of all or any parts of the information in the document.

Simple documents such as notes and memoranda are 'shallow indexed' in a few minutes, whereas a full-blown project report in several sections might take several hours (and have over a hundred keywords). An indexing time of half an hour to an hour is usual.

A point to note is the different standards of indexing required for mere location of a document as against retrieval of *information.*

Filing arrangements for reports were altered when the change was made to co-ordinate indexing. The former classified collections were kept in filing cabinets, documents being numbered according to source or subject. All reports issued or received since January 1964 are in a simple, serially-numbered arrangement in box files, with no separation by subject, source, or security category. (But note that switching to co-ordinate indexing does not *necessarily* involve this change, as a serially numbered abstract card can be used, with the reports themselves numbered and filed by any existing classified arrangement.)

Archival and less used material is segregated in remote (and cheaper) storage areas. (Floor space and office accommodation in the main Report File area is at a premium and we pay a rental there of £2,400 a year, which is equivalent to £1 per square foot.)

Use of reports

For an organization spending several million pounds annually on Research and Development, and even more at present on capital construction programmes for new plant, it is obvious that the report records resulting from or in connection with this effort are extremely valuable. It is vitally important to make sure that full and effective use is made of such information.

The first problem is 'current awareness', i.e. to notify staff of new reports. This is achieved partly by the controlled distribution described earlier and also by routine circulation of lists of titles, separate lists being prepared for confidential and non-confidential reports issued within the Division or received from other Divisions and Associated Companies. A consolidated ICI report list is also circulated, made up from Divisional contributions. These lists go to all senior technical staff in the Division. Listed reports may then be borrowed from the Report Centre, subject to recall and security control procedures.

Progress reports on current research, technical and commercial development, engineering, etc., both within the Division and elsewhere are also selectively distributed at periodic intervals (monthly and quarterly).

The general feeling among staff with in-baskets is that there is now far too much paperwork to read, but communication is a real problem in a large organization where personal contact by telephone or visit is often inconvenient or impossible at the time desired. Circulation of a brief memorandum, technical note, or committee minute is often the quickest way of keeping several people simultaneously informed on matters concerning their immediate interests.

It is said, of course, that information is only of value when it is *wanted,* and this leads us to consideration of *retrieval* of information from reports.

Technical staff are encouraged to consult the Report Centre before starting new projects. Sometimes difficulties arise because of the geographical separation of Libraries and report files and the occasional failure of Library users to remember that further useful information may be available in reports. Inquiries handled by Library or report file staff of course take account of *all* resources, internal or external.

The assistant information officers in the Report Centre spend about half their time on searching and inquiry work in direct personal contact with the user, who may be a research chemist, a physicist, a mathematician, an engineer or works manager, or a member of a techno-commercial department. This is the really interesting part of information work, because it covers the whole spectrum of our industrial operations and interests. User liaison is vitally important and we recognize now that this may be best achieved by employing technically qualified staff in a user group (e.g. research) seconded to information work. These are information scientists who provide selective current awareness and retrieval most effectively to users with whom they come into close personal contact.

Recently a critical investigation by work study methods of our current awareness services for literature and patents was carried out by means of a questionnaire sent to over a thousand readers. This revealed clearly the failure of many to use the information facilities available to them because they were not fully informed or aware of them. The conclusions apply also to use of company information and we are remedying this situation by a series of 'Information Talks', supplemented by 'Information Notes'. A Company Guide to Technical Information and 'Information Services' for issue to all technical staff is at present undergoing revision.

The use pattern of reports by staff in various departments is approximately:

Research and Development (Mond and Petrochemical and Polymer)	50 per cent
Technical and Operations	20 per cent
Engineers	10 per cent
Works	10 per cent
Others	10 per cent

The useful 'life' of a technical report is longer for research (up to thirty years) than for engineering, works process or commercial documents.

Critical selection based on experience and examination of our loan records has enabled us to formulate procedures and time schedules for thinning out multiple copies down to single file copies (plus photocopying when required), segregation and archival storage, or ultimate disposal. On the latter we play safe. Until recently we had an archivist who wrote up some very interesting histories of our companies and processes in the pre-ICI era, but work of this kind, although interesting, does not earn our present profits and can only go on when suitably experienced and interested senior staff can be made available. Sometimes this is possible immediately before their retirement; in other cases company histories are done on a fee-paying basis by senior staff in retirement.

Security grading and control

Use of a 'birth certificate' has already been mentioned. The security grading of a report on the ICI system of classification is allocated by the Report Centre in consultation with the man who approves the report; the availability of the document at the time of issue is similarly decided, taking account of the author's recommendations.

Later availability in response to inquiry or results of search are decided on the principle of 'need to know' for the purpose of the job. The Report Centre manager has authority delegated to him for deciding availability on this basis, and he will, if necessary, consult the borrower's immediate superior or the appropriate departmental manager or head of department. In the case of requests from another part of ICI or an Associated Company for information covered by licensing agreements, formal approval for issue or lending may have to be obtained from the appropriate director.

Stamping of all copies of reports is done to indicate file number, security category and any other special restrictions or availability (e.g. special agreements with other companies).

The file copy is used to record additions to circulations, corrections amendments, etc. Agreements and licensing arrangements are the responsibility of another department, but their implementation as far as exchange of recorded information is concerned is via the Report Centre, whose manager therefore has to be familiar with the various covenants defining the scope and subject content of agreements.

Preparation and issue of edited and censored versions and the distribution and storage of reports received under agreement are an important function of the Report Centre. Judgment and experience are of paramount importance here, together with up-to-date knowledge of 'sensitive areas'. Liaison with Patents and Development Department ensures proper protection of new research and development information. Commercial and policy information is not usually handled through the Report Centre.

Security grading at the time of issue of the report may be decided by the patent situation, commercial policy, liaison with other companies, etc., or personnel reasons (e.g. proposals to close down a works or findings of a fatal accident inquiry).

Later it may be possible to declassify the report and so make it more generally available. This is normally done on an *ad hoc* basis, i.e. in response to later inquiry, but there is some virtue in re-listing declassified material to extend its availability. A record on the file copy or birth certificate gives the reasons why it was initially so classified. On the question of access to the report files and their several indexes, we have always preferred to work a closed 'access' system with information searching done by Report Centre staff familiar with the indexes. Subsequent 'screening' of abstracts cards or original documents may be by information staff or inquirer. This presupposes close user liaison and the correct formulation of search strategy based on defining the limits of the inquiry and 'feedback' if this is initially unsuccessful. Better indexing is done by information staff who spend a major part of their time answering inquiries.

Shallow report indexes for 'browsing' by the user, placed at points remote from the main indexes, e.g. in the Library, have also been used for simple *location* of reports by author or title, as distinct from information retrieval by Boolean search.

Recent thinking has led us to consider computer print-out of report indexes, lists, bibliographies, etc.

We are at present investigating the use of mechanized equipment (i.e. key punching, card sorting and document writing machines) and computers for making report information more effectively available. If this development work is successful we shall convert our existing manual co-ordinate indexes to computer printed versions, but it is certain that we shall retain the manual system for some time as it serves our everyday needs for simple inquiries quickly and cheaply. Eventually we may find manual manipulation of multiple punched card decks too cumbersome. (At present we are completing one card deck a year for reports.)

Computerizing our report records will have several advantages, including:

(1) faster clerical input to indexes.
(2) ease of updating indexes.
(3) duplication facility, i.e., location of duplicate indexes at points remote

from the Report Centre and consequent open access and 'browsing' facility.

(4) rapid search of large report collections and print-out of results in forms convenient for the user.

(5) applications to routine clerical work, e.g. routine circulation, loan records and recall.

Our approach to the use of computers is at the moment based on a modified KWOC programme used on the IBM 1401, and we are making all necessary arrangements to adapt to the 360 series now coming into use in ICI.

FIG. 1

ISSUE FORM FOR REPORTS, NOTES AND MEMORANDA

FILE NUMBER OF REPORT/NOTE/MEMORANDUM:
(delete as necessary) (to be allocated by Report Centre)

TITLE:
(in block letters)

AUTHOR(S):
(in block letters)

APPROVED BY: (Group Manager or Research Leader)

DATE: (to be issued before)

SECURITY CLASSIFICATION: (to be allocated by Report Centre in agreement with Group Manager, or Research Leader, according to ICI Secretary's instruction of 1st October, 1962.

Reports		*Notes/Memos*
Available throughout ICI	—Category A	Ordinary
Confidential	—Category B	Confidential
Highly Confidential	—Category C	Highly Confidential
Agreements		Agreements

(delete as necessary)

CIRCULATION: (to be allocated by Report Centre advised by Group Manager or Research Leader).

For Action:

For Information:

Does the Report/Note/Memo contain unpublished information made available by, or intended for, other ICI Divisions or other Companies?

YES/NO

(if answer is YES see Note (3) overleaf)

PROCESS OF PUBLICATION:

	Date	*Initialled by*
Manuscript approved		
Manuscript (with suggested circulation) sent to Report Centre, where it is numbered and classified		
Manuscript sent to Typing Section		
Manuscript typed on stencils		
Stencils corrected (please use Correction Sheet)		
Copy authorized for duplication and issue		
Copies issued		

Notes

(1) Titles of issued Reports are advertised by the Report Centre in *weekly lists* which are available to T.O.'s in the Division. Bi-monthly lists of Notes and Memoranda are also prepared and circulated. Listed documents may be borrowed subject to the security restrictions indicated in (2) below.
Reports (but *not* Notes or Memos) are also listed in the appropriate sections of the Head Office Consolidated Weekly List of Reports, which are circulated to ICI Divisions and Associated Companies.
All Reports, Notes and Memos are *indexed* by the Report Centre and the indexed records notified to the ICI Central Technical Information Unit (with suitable 'suppression' for confidential information) for inclusion in a central ICI index of Company information.

(2) *Information from or for other Divisions or other Companies*
Approval should be obtained both for the proposed category and the proposed distribution (if any) outside Mond Division.
Please indicate here (briefly) the information concerned:

FIG. 2: KEYWORDS

		Translation
Sodium Manufacture Metals (A) and Manufacture	—	Electrolysis Electrolytes Europe (E)
Electrolytic Cell Anodes Diaphragms	—	Design Performance Materials of Construction Current Density/Efficiency
Electrolytes	—	Purification Iron Compounds Water
Sodium Chlorides (B) Sodium Chloride Calcium Chloride Potassium Chloride Barium Compounds (C)	—	Physical Properties (D) Solubility Viscosity Systems Electrical Conductivity Density

Uniterm Index:

Potassium (A)
Barium Chloride (B) (C)
Surface Tension (D)
U.S.S.R. (E)

FIG. 3: ROLE INDICATORS

1 Input, Reactant, Raw Material, Monomer, etc., Reactions.
2 Product, Output, Manufacture.
3 Waste, Contaminant, Impurity, Effluent.
4 Additive, Special Agent, Catalyst, Initiator, Accelerator, Stabilizer.
5 Medium, Solvent, Atmosphere, Carrier, Environment, Support.

CONTROL OF COMMERCIALLY CONFIDENTIAL INFORMATION IN REPORTS

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Presented at the Aslib Conference on Handling Confidential Report Material, Wednesday 11th May 1966

The problem

I SHALL be discussing the problem that faces all large organizations which employ research scientists in the fields of applied research and technology, i.e. fields in which results having commercial value are produced. This problem is not met, or not met to the same extent, in laboratories engaged in fundamental research, such as university laboratories. Here, although new knowledge often leads ultimately to commercial applications, it is usually not of immediate commercial value, and so the results can be published freely, and staff engaged on such work would be indignant at any proposal to restrict their right to publish results freely. Research in university laboratories sponsored by firms or commercial organizations, however, presents the same problems as these which we are discussing.

The end-products of all laboratory work are, or are embodied in, reports, which deal with any of a wide range of subjects, for example, improvements to a chemical process, a new engineering design, a specially developed instrument, or an alloy of novel composition.

The basic problem with reports from all applied laboratories is the same, viz. to arrive at a workable system of discriminating between what information can be published openly, and what must remain limited in distribution, and to whom the latter should be limited. I have illustrated my discussion of this problem by showing how it is solved by two separate types of organization, viz. an industrial research association and a large nationalized industry.

Open publication

First, let us briefly look at open publication, which may be in the form of papers in scientific or technical journals, books, lectures, conference papers, sales brochures, or research reports produced internally but made available to anybody who wants them, through defined channels. The activities of some organizations become known to the world at large mainly through their reports, especially if they are working to a tight programme of research and development which leaves little time for rewriting material in the form demanded, say, by a professional journal.

Every research and development organization which looks on its own work with respect, wishes to issue as many open publications as possible, for several reasons, mainly:

a to uphold its own prestige in the scientific world by describing good work;

b the reasonable hope that publication of research and development results will bring a reverse flow of ideas or results from others working in the same fields of interest, whether by direct communication or by subsequent open publications of a similar nature.

Likewise the individual research worker desires open publication, for reasons which include personal prestige and often an innate feeling for free interchange of ideas which we have already seen applying to university work.

In addition, organizations sponsored by Government Departments, like most of the industrial research associations, or organizations supported to any extent by public funds, are usually required to publish as much of their work as possible (consistent with national security and commercial operations), so that it will assist science and industry in general (who have partly paid for it).

Limited issue of research and development reports

There are three main reasons for wishing important research and development results to be issued only to a limited audience (i.e. not openly):

a to protect concepts which are in the early stages of development, but which later may become patentable or otherwise capable of bringing a cash return;

b to give the first benefit of the results to collaborating organizations. In the case of a research association, these would be the member-firms which pay subscriptions; for an organization like the UKAEA, they would be individual firms, groups of firms, or organizations abroad with whom some kind of commercial agreement for interchange of information has been entered into;

c to safeguard 'third-party information', i.e. information which has been entrusted in confidence to the organization on the understanding that it will be used to further the organization's work, but will not be made publicly available.

Flow pattern of reports

We can now see a flow pattern in the production of 'R. & D.' information. It begins with the writing of a technical report, using the word 'report' in its widest sense. This may be done for several reasons. The worker may be required to submit an interim report whenever his project reaches some identifiable stage. Almost certainly he will have to write a final report at the end of any project. He may be required to write progress reports at fixed intervals (e.g., monthly, quarterly, annually) for inclusion in, say, a departmental report within his own organization, or at irregular intervals to satisfy the needs of a technical committee supervising his work. Once his report is drafted, he may receive assistance, in varying degrees according to the organization, with the production, dissemination, storage and protection of his material. This help comes from information and editorial sections, and libraries. For example, in Reactor Group of the UKAEA we regard technical reports as a form of publicity for our activities, and provide a full editorial and printing service for those reports judged to be of sufficient importance (designated 'TRG Reports').

The end of the flow pattern is the book, article, conference paper, openly-available internal report, report issued outside the organization on a limited distribution, or report confined to the organization's own staff, as the case may be.

Somewhere in the middle of the flow scheme must occur some form of 'censorship', which usually involves a system of segregating information and printing distinguishing markings on the documents.

Reviewing reports to decide availability

Normally in large organizations the distribution of technical reports is not decided by the author. The principle is that a technical expert should not be expected to be expert also in the commercial implications of his discoveries, nor to have detailed knowledge of all the various contracts and agreements which his organization has made, which may require selected report material to be sent outside to authorized recipients in specified fields.

Some organizations make a preliminary selection as to availability by issuing different series of documents, for example, Technical Reports, Technical Notes and Technical Memoranda; one or more of these series is only circulated within the organization. Work of a preliminary or tentative nature can be reported in a series not circulated outside the organization, while final and important work worthy of wide circulation appears in a different series. Such a selection, however, is not on the basis of commercial value.

Selection according to commercial importance can be made in a number of ways. I shall mention two which I know well, but others are clearly possible and are practised elsewhere.

In the British Iron and Steel Research Association (BISRA), all formal research reports are submitted initially to one of the research committees. These committees have been appointed to supervise all aspects of the Association's work. Their members are drawn from the management and research staff of member-firms, together with representatives of universities, colleges of technology, etc.; on election to the committees they undertake to act in their personal capacities, and to respect the confidential nature of any information which they obtain during committee work. They are experts in the technical fields concerned, and the firms' representatives are naturally familiar with the commercial implications of every research project. If a committee accept a report, which means that they approve it technically, they are automatically asked to give a ruling as to how it is to be distributed—for instance, openly to the public, to all member-firms, or on a more limited basis to some higher committee within BISRA. If a clear decision cannot be reached, there is provision for referring the matter to a higher committee. Since the work is normally directed so as to aid the iron and steel industry as a whole, information is usually sent in the first place to all member-firms.

In the UKAEA, reports originating within any of its five Groups receive technical approval for issue by senior technical management. They are then scrutinised for their commercial value by a special staff of experts appointed to do this work. These people are in close touch with the patents offices and offices dealing with commercial agreements made with British industry and overseas organizations, and are well equipped to judge the commercial worth of the reports. They work to a code laid down and revised periodically by an internal working party drawn from all Groups and the commercial departments of the London office. Their task broadly is to decide whether the material can be released to the public, or issued only on a limited basis under commercial agreements and, if so, to whom.

Systems of markings

Any decision to limit the availability of information in reports must result in a system of marking documents so that all staff (including librarians and the clerical staff of libraries) will readily understand how the information is to be handled or protected, and who is authorized to have access to it.

Such marking schemes are arbitrary; they can be devised by the organization itself, without having to fit into a wider pattern such as the official security classification markings used in Government departments (principally in the defence departments). The actual markings used, however, should not be so arbitrary that they do not convey a clear message to anybody reading them. The legal standing of such markings is less clear-cut than that of security classifications, and the integrity of each system depends on its being understood by all collaborating organizations, and on responsible action by the staff of the issuing organization and all recipients to safeguard information appropriately.

Marking schemes can vary in complexity. Many depend on using standard words or phrases printed boldly in a prominent place on the report cover, with an additional warning panel either on or at the back of the cover to explain the restrictions on issue. Some schemes also use colour codes for document covers or the edges of the leaves.

BISRA uses a marking system based on the Government security classifications, although the meanings of the markings are different from the official definitions of classifications. Reports released for public availability are called 'Open'. Those made available to member-firms are marked 'Restricted', and carry a warning panel explaining the availability. Those marked 'Confidential' are only available to members of research committees or BISRA staff, and bear appropriate warning panels. 'Strictly Confidential' is an even more restrictive marking for highly sensitive material.

In the UKAEA, reports which can be made available to the public are marked UNCLASSIFIED. For reports of commercial importance, there are two markings which indicate commercial sensitivity, one being more restrictive than the other. Reports so marked are normally available to all UKAEA staff, and may be authorized for release to firms or organizations which are interested in the subject-matter and have entered into a formal agreement covering that field. Carefully worded warning panels, printed on the reports, explain the meaning of the markings in terms of availability. With more highly sensitive material, further markings may be added to the 'label' of commercial sensitivity already printed on the report. Such markings indicate restrictions on the issue of the report; these restrictions may vary widely from a highly selective distribution only to those named on the distribution list (printed inside the report), to issue restricted to the staff of the UKAEA itself or the UKAEA and one or more named firms or organizations. In the latter instance a warning panel is used to specify precisely those who may have access to the information.

Modification of information to allow wider publication

So far we have looked at the formal aspects of producing and segregating research and development information in a simple way. In practice, matters are more complicated, and the opposing requirements of open publication and maintaining commercial secrecy are often largely reconciled by editorial artifices, using 'editorial' in a wide sense. Two versions of the same report may be issued, a full version with a limited distribution, and a version which gives the basic facts, but from which commercially valuable detail has been removed, to allow public issue. Or a report may be issued in parts, all sensitive material being relegated to a part issued only with a limited distribution. To take some examples:

a an instrument developed, say, for process control could, once its patent rights were established, be described openly in terms of what it measures and how well it performs, while its specific application remained undisclosed;

b fundamental work on, say, the properties of a chemical substance or alloy could be openly described, while the technical use for which it was developed remained undisclosed;

c reports might be circulated with a limited distribution, criticising a commercial material or product in the context of a specific application, or comparing items from different manufacturers. If these reports were published, they might render the publisher liable to legal action, but open publication might often safely be made by referring to 'Manufacturer A', 'Manufacturer B', etc., or by referring, say, to an alloy in terms of type and composition, but not by trade name.

Conclusions

The problems of commercially confidential reports produced in large research and development organizations are centred on the conflict of two requirements—on one hand, to supply valuable information to the organization's sponsors or commercial associates, and, on the other, to publish material openly so as to maintain a reputation and to satisfy legitimate public expectations. There is no single way to resolve these problems, and the two ways which we have examined do not necessarily represent standard practice. In general, however, we can say that questions involving commercial considerations are best settled by people other than the authors of the reports, that an appreciable expenditure of effort by various sections of the organization's staff is needed to resolve the problems, and that means of identifying sensitive material after the segregation process must be foolproof and thoroughly understood by everybody who handles it.

Acknowledgments

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DISCUSSION

Mr A. E. Cornfield (BP Trading Ltd) considered that segregation of confidential reports gives greater security, and special treatment can more easily be given them when accessioning, lending and assisting readers. Messengers' signatures should not be accepted for such material, since this makes checking on loans difficult. Mr Cornfield also considered that, contrary to Miss May's figures, lateral suspension units were more economical than four-drawer vertical filing cabinets.

Mr Jermy said that, when reports which included commerical confidential material were involved, it was better to segregate the whole reports collection from the main library, to which access could be unrestricted. The staff of the reports library could then be specially trained to establish the identity of every potential borrower, and whether he was entitled or had been specificially authorized to see the report which he was requesting.

Mr Lyle said that, provided some warning signals were placed on confidential files, it was more convenient not to segregate confidential material. Government secret material was kept apart and locked up. The entire collection was kept in a security area and locked up when staff were away.

Mr D. Ball (Reed Development Services) considered that the simpler the security classification the easier it was to regrade reports; colour coding was cumbersome. The catalogue should be complementary to the order of the main collection, not a mirror of it.

Mr Jermy agreed that colour-coding could lead to difficulties when reports were downgraded. Reactor Group of the UKAEA had recently given up the use of different colours for different gradings, and relied for identification on the grading being printed prominently on the front cover, as well as on the individual pages of the report.

Mr R. W. de Vere Stacpoole (Gillette) said that holders of confidential reports must constantly be reminded that copying was not permitted. At Gillette, the Information Centre was the only source of photocopies of technical documents.

Mr W. H. Holmes (Hawker Siddeley Aviation) asked whether documents were downgraded on an 'elapsed time' basis; was it sufficient to overstamp the front page when regrading?

Mr Jermy said that the declassification of security classified reports was covered by Government security regulations. With commercial material, while it is clearly desirable to review reports for downgrading on a regular periodic basis, this was not always possible because of the staff effort involved. In practice, downgrading was often done either in response to a particular need to refer to readily available material, or on the basis of a particular area of interest from which restriction had been removed. Again, while it was best to change the grading on all pages of the report, availability of staff might often mean that only the grading on the front cover could be changed. This should be done with care, so that the old grading was completely obscured and the new one prominently displayed, with an added note of the date and authority for downgrading.

Mr H. Cyglieski (Winthrop Products Co) asked what measures were taken to preserve the confidential nature of reports during their production.

Mr Lyle replied that the production and distribution of confidential reports in Mond Division was carried out under the supervision of senior typists or clerks. No spare copies were produced and stencils and spare pages were sent to the Division Report Centre together with the correct number of copies required for distribution.

Mr R. A. Nightingale (BP Trading Ltd) asked whether in ICI computer-produced lists of report titles underwent the same control as the reports themselves.

Mr Lyle replied that computer listings of reports were regarded as confidential; only a few lists were produced and all were deposited in security areas, under the control of senior management.

Mr A. S. Reid asked whether Mr Jermy experienced much resistance, on the part of scientists, to having their reports edited, and how he overcame this.

Mr Jermy replied that he had met little, if any, resistance. This depended on the editor establishing close personal contact with authors, and arranging to meet them to discuss points of difficulty arising from drafts. These meetings gave the opportunity for the editor to explain, for example, why he was seeking to rewrite a passage to give greater clarity; why he was altering unit abbreviations, bibliographical references and the like to standard forms; or why he was proposing to display illustrative material in a more effective way. By working in this way he could convince authors that he was there to help them to make the best impact with the material which they were presenting.

Mr R. W. de Vere Stacpoole asked whether internal reports were edited in the same manner as external publications. If so, was this of value?

Mr Jermy replied that in Reactor Group of the UKAEA TRG Reports received full editorial treatment, whether or not they were available externally. This was because they were substantial accounts of work, and were meant to stand as reliable records. Even if restrictions were imposed on their distribution for commercial reasons, the Reports might still be circulated widely within the UKAEA and to collaborating organizations, and therefore needed to be edited fully and printed well. With full initial editing, little further work was needed if Reports were subsequently downgraded and reprinted. Accounts of work which were of an interim, ephemeral or speculative nature were not issued in the 'TRG Report' series, and were not normally edited or printed to the same standards as TRG Reports.

Mr P. Wightman (UKAEA, Windscale) asked whether the number of inquiries received justified the considerable effort expanded in indexing ICI progress reports, as described by Mr Lyle.

Mr Lyle replied that this was difficult to assess at present, but that it was felt that the cost of research and development merited the additional expense of deep-indexing individual research progress topics, some of which would never be written up formally. Current awareness would cover the first few years, but after, say, five years had elapsed it would be very difficult to retrieve information on research topics unless they were individually indexed.

Mr H. Cyglieski asked whether literature experts were employed at the ICI Record Centre to prepare surveys of data on response to subject inquiries.

Mr Lyle replied that this was not done as a regular service. Surveys could be specially commissioned, and up to a point certain of the staff in the Centre were competent to do this work. Normally the inquirer was provided with all pertinent references and he was responsible for completing and writing up the survey.

Mr J. R. Yates (Smith & Nephew Research) asked whether unsuccessful ICI research was recorded in reports, so that it should not be repeated in another Division.

Mr Lyle replied that lengthy research projects were recorded in a final report whether successful or not. Some unsuccessful projects, aborted at an early stage, might not be written up fully, but details of the work could be recovered, since the Research Progress Reports were deep-indexed, and all experimentation was recorded.

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ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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ABILITY AND SERVICE. Technical or commercial translations into/from Dutch and German. Speller-Kuijpers, FIL, NGV, 6 Lakeside, Ealing, London W13. ALPerton 1045.

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LIBRARIAN required by W. S. Atkins & Partners to be responsible for running their busy central technical library. Applicants should have about five years' previous experience in a similar position. Preference will be given to applicants having library or technical qualifications, but applications are also welcomed from those having longer library experience together with O/A level qualifications or an engineering background. Please apply in writing giving full particulars and present salary to: Mr I. W. Cullen, Personnel Department, W. S. Atkins & Partners, Woodcote Grove, Ashley Road, Epsom, Surrey.

TECHNICAL LIBRARIAN. MIDLAND SILICONES LIMITED require a Technical Librarian to run the library, and assist in the Information Service of the Research and Development Departments, at Barry, Glamorgan. Knowledge of library work, including document storage and retrieval, and control of lending or circulation, is essential. Some knowledge of chemistry, or general science, is desirable, and ability to read a foreign language, particularly German, Russian or French, would be useful. Applications to: The Group Staff Officer, Albright & Wilson Ltd, 1 Knightsbridge Green, London SW1. Ref. No. 575.

WOOLWICH POLYTECHNIC requires ASSISTANT LIBRARIAN. Applications are invited for the post of Assistant Librarian. Candidates should be qualified librarians, preferably with some experience in a college library although applicants who have recently left Library School will be considered. Salary scale is £1,200 × £50—£1,350 × £75—£1,425; initial salary according to qualifications and experience.

Further particulars and forms of application obtainable from the Clerk to the Governors, Woolwich Polytechnic, Wellington Street, London SE18, to whom they should be returned by 2nd September 1966.

SCOTTISH HOSPITAL CENTRE

LIBRARIAN required for new post at Scottish Hospital Centre. Applicants should be experienced Chartered Librarians interested in all aspects of library work in hospitals.

Appointment for 3 years initially. Duties will include assisting in development of Centre's reference library and in a survey of library services in Scottish hospitals. Salary scale £1,164-£1,527.

Applications stating age, qualifications and experience to Secretary, Scottish Hospital Centre, Crewe Road South, Edinburgh 4, by 28th August, 1966.

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Please write for full details of this appointment and application form to:

The Divisional Personnel Manager (376 Aslib)
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157, Blackfriars Road, London, S.E.1.

information science

The United Kingdom Atomic Energy Authority have a vacancy in the Information Section of the Technical Library at Aldermaston. Information staff are expected to develop close liaison with scientists working in a subject related to their own qualifications; a computer system is being introduced to assist in the dissemination of information about current literature. Other duties include answering scientific and technical enquiries and compiling bibliographies of literature references. The post offers considerable scope for the study and application of modern information techniques.

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The Chief Librarian will be responsible for the organisation and running of a Central Library and Information Service. The post will involve the integration into a unified system of all forms of documentation handled in a national broadcasting undertaking, including books, periodicals, films, stills, tapes, discs, etc. The Library will serve the News, Programme and Engineering Divisions.

Applicants should be University Graduates or possess equivalent qualifications, with professional training (chartered librarian or some years' experience in a comparable position) preferably in special library work and with competence in indexing techniques.

The Chief Librarian should have the professional standing and the administrative drive to establish the network of controls essential for the whole Service.

The salary will be negotiable and will be commensurate with the person's experience and qualifications.

Applications giving details of age, education, qualifications and experience should be forwarded to reach the

Personnel Administration Officer,
Radio Telefís Éireann,
Donnybrook, Dublin, 4

not later than 6th September, 1966.
Envelopes should be marked "CHIEF LIBRARIAN".

National Electronics Research Council

SDI Project

INFORMATION STAFF

The SDI Project is planned as a large-scale investigation of the value, economics and acceptability of a Selective Dissemination of Information system. A computer-based system will be set up to provide current-awareness information and, subsequently, retrospective-searching facilities to 800 electronics research workers.

The design study has been successfully completed and a team is now being formed for the main part of the Project. The engagements will be for an initial period of 2 years.

The professional staff required are:

Analysts (2):	for compilation and modification of user-profiles; conduct of surveys and analysis of results. Salaries: £1,600–£1,900 p.a.
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For these posts one or more of the following are required:

(*a*) Qualifications or experience in technical information work.
(*b*) Experience in indexing technical documents.
(*c*) Qualifications or experience in electronics, physics or electrical engineering.

These posts offer an opportunity of gaining experience both in the investigation of information systems and in a developing information technique.

If the possibility of joining the team interests you we should be happy to discuss the matter with you, informally and in confidence. Please contact, by telephone or letter, either the Project Director, T. M. Aitchison (MUSeum 2077), or the Assistant Director, P. Clague (MUSeum 2078), at the following address: SDI Project, NERC, 50 Bloomsbury Street, London WC1.

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Reckitt & Sons Limited have a vacancy for an Assistant in their Head Office Library and Information Service. The work is varied and interesting and relates particularly to the collection and dissemination throughout the Company of relevant published information.

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Textile Industry Information Sources: *An Annotated Guide to the Literature of Textile Fibers, Dyes and Dyeing, Design and Description, Weaving, Machinery, and Other Subjects.* Edited by Joseph Kopycinski, Lowell Technological Institute. Covers the literature of America's ninth largest industry. 194 pages.

The Developing Nations: *A Guide to Information Sources Concerning Their Economic, Political, Technical and Social Problems.* Edited by Eloise ReQua and Jane Statham, Library of International Relations. Covers material touching upon all economic, technical, social, and political aspects of the difficult problems confronting both the less-developed nations and those assisting them. 339 pages.

Standards and Specifications Information Sources: *A Guide to Literature and to Public and Private Agencies Concerned with Technological Uniformities in Description and Manufacturing.* Edited by Erasmas J. Struglia, Consumers Union of the U.S. Deals with the standardization activities that pertain to the development, coordination, and application of a rational system of standards. 187 pages.

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Transportation Information Sources. Edited by Kenneth B. Metcalf, late archivist and librarian, Henry Ford Museum and Greenfield Village, Dearborn, Michigan. An annotated guide to publications, agencies, and other data sources concerning rail, air, water, road, and pipeline transportation. 307 pages.

Business Trends and Forecasting Information Sources. Edited by James B. Woy, Mercantile Library, Free Library of Philadelphia. Provides bibliographical notes on theoretical and technical publications and sources of data, as well as a unique glossary of terms used in economic forecasting, useful to either professional or layman. 152 pages.

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MISS G. JOHNSON

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W. R. MAIDMENT

Progress in Computer Applications in some British University Libraries
RICHARD T. KIMBER

The Role of the British National Bibliography in the Application of Computers to Public Library Systems
A. J. WELLS

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Aslib Proc. vol.18 no.9 pp.233-284 London, September 1966

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ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 18 **September 1966** **Number 9**

ASLIB CALENDAR 1966

October

WED.5.	Film Libraries Group. Wine party and Opening meeting. Aslib. 6.45 p.m.
MON.17–THUR.27.	Senior introductory course to special library and information work.
TUE.18.	Transport Group visit to GPO Railway Sorting Office.
MON.24 – WED.26.	Chemical Group course, Industrial Chemicals Laboratory (Egham), Shell Research Ltd.
WED.26.	Evening meeting at Aslib. 5 for 5.30 p.m. 'The mechanization of serial records, with particular reference to subscription control', by Martin Scoones.
WED.26.	Engineering Group meeting. 'Industrial Engineering', Birmingham. See paragraph below.
MON.31 – FRI.4.	Course on abstracting and co-ordinate indexing.

November

FRI.4.	Criminology Group, inaugural meeting, Churchill College, Cambridge.
MON.7.	Course on principles of information system design and planning.
TUE.8.	Course on principles of thesaurus development.
WED.23.	Evening meeting at Aslib. 5 for 5.30 p.m. 'Copyright', by G. Woledge.

December

WED.21.	Members' Christmas Party.

1967

April

MON.3 – FRI.7.	International Conference on Education for Scientific Information Work. London. See paragraph below.
FRI.14 – SUN.16.	Transport and Economics Groups conference at Leicester University.

May

MON.29 – WED.31.	Chemical Group Conference at Attingham, near Shrewsbury.

October

MON.9 – THUR.12.	41st Annual Conference at Harrogate.

Criminology Group's First Meeting

The Aslib Criminology Group will be holding its first meeting in Cambridge on Friday, 4th November. The meeting will be welcomed by Professor Radzinowicz, Wolfson Professor of Criminology and Director of the Institute of Criminology, and will visit the Institute and the Squire Law Library. Further details will be circulated later. The Group is compiling a union list of periodicals in this field and would be grateful for notification of holdings from any libraries who would like to contribute to the list.

Transport and Economics Groups Conference

A joint conference of these two Aslib groups will be held at the University of Leicester, from Friday 14th April to Sunday 16th April 1967.

The conference will cover all aspects of transport and its literature. The main speakers are: Prof Jack Simmons of Leicester University, on transport history and the library's collections; Mr W. K. Smigielski, City Planning Officer, on the Leicester city traffic plan; Prof T. C. Barker of Kent, on economic history aspects of transport and its literature; and Mr J. M. Johnston, editor of the ABC World Airways Guide, on their computerized system of publication. There will also be a conducted tour of the University Library and a general 'forum' of contributions and discussion in the field of transport literature.

An early indication of the probable numbers attending is needed, and all members of other Aslib groups who are interested are asked to notify K. C. Walker, Lyon Playfair Library, Imperial College, South Kensington, London SW7, by Wednesday 30th November.

Industrial Engineering

Industrial engineering is a topic to which increasing reference is being made in technical and managerial circles, but many people have only a hazy idea of its connotation. In the USA there is a professional body covering this field, but so far no similar organization has been established in the United Kingdom. To provide Aslib members with an opportunity to learn something of the aims and activities of industrial engineers in this country, the Engineering Group is holding an afternoon meeting on Wednesday 26th October 1966, at which Mr A. G. Thompson (Director of Management Services, Tubes Ltd) will speak on the job of the industrial engineer, and Mr A. L. Minter (Chief Industrial Engineer—Work Study, British Aluminium Co Ltd) will speak on the literature needs of the industrial engineer. It is hoped that the ensuing discussion will give rise to a fruitful cross-fertilization of ideas between industrial engineers and the librarians and information officers who may be called upon to meet their requirements.

The meeting will take place at the Engineering Centre, Broad Street, Birmingham, beginning at 2.30 p.m. Tickets for admission (free to Aslib members, 10*s* each to non-members) may be obtained from Mr D. Whale, Tube Investments, Department of Technical Information, Rocky Lane, Aston, Birmingham 6.

Chemical Group

The Chemical Group is to hold a sherry party at Aslib Headquarters on Tuesday 15th November beginning at 6 p.m. During the evening there will be a short discussion about the 'Basic Chemistry for Non-Chemists' course, and some of the delegates who attended will give their own assessment. There will be no charge to Chemical Group members or others who may be interested in the work of the Group.

Junior Introductory Course

A Junior Introductory Course to Special Library and Information Work will be held at Aslib from Tuesday, 29th November, to Friday, 2nd December 1966. It is intended for students who have recently taken up junior posts in special libraries and information departments, and is designed to provide those who are occupied mainly in routine duties with an understanding of their work and its place in the organization, which will help them improve their efficiency and give them an incentive to progress to more exacting tasks. The course has been extensively revised since it was last given, and much new material has been added. It will include lectures on various aspects of library and information work, visits to libraries and information departments, and a number of discussion sessions. The fee for the course will be eight guineas.

A programme of the course is enclosed in this issue, and applications to attend should be made on the form contained in it. As these courses are usually heavily overbooked, intending students are advised to book early. Provisional bookings will be accepted by telephone or Telex. Students holding a university degree or in a senior position will not be accepted for this course and are advised to wait for the next Senior Introductory Course.

International Conference on Education for Scientific Information Work

An international conference on education for scientific information work will be held under the auspices of the FID from Monday 3rd to Friday 7th April 1967 at Queen Elizabeth College, London. The conference will be sponsored jointly by the FID/TD Committee and by Aslib, the Institute of Information Scientists, and the Office of Scientific and Technical Information (OSTI).

The programme will be organized in five areas as follows:

1 *Future needs of education in information science*

This will include a survey of existing courses, the identification of the various levels of needs and the estimation of manpower requirements.

2 *Educational background for entry to courses and their ultimate aim*

This will include the educational requirements for entry to courses, at all levels up to, and including, the post-graduate, and the standard (and qualification) aimed at by the completion of the course. Also included will be the part which both courses (up to three months) and longer courses (of the order of one academic year or more) can play.

3 *Syllabus and structure of courses*

This will include an analysis of the various topics which should be found in the curricula for various courses, particularly with reference to the provision of special options based on a fundamental core. The intention is to cover short and long courses at the various levels which have been defined. Both the practical and theoretical content will be included.

4 *Collaboration*

This will include the need for co-operation within teaching institutions, particularly with respect to the provision of specialist lecturers and the sharing of facilities and teaching material. This theme will then be developed in so far as collaboration with other institutions and organizations (both industrial and governmental) is concerned, and covering the important aspect of ensuring that the wants of the user are reflected in the curricula.

5 *The provision of teachers and research workers*

This will include an assessment of the present supply of teachers and the future demand, both from the full-time and part-time point of view. The training of people to teach students wishing to enter, or already engaged on, information work will be covered. The need for teachers at the graduate level capable of training research workers and carrying out research work themselves will be included, as will the types of educational background necessary for potential research workers, particularly as regards the multi-disciplined approach to information problems.

The conference is intended for those with experience of organizing education for information work, and participation will be by invitation only. Invitations to contribute papers have already been sent to a number of possible participants, but it is realized that there may be others who may be able to make valuable contributions. Any person engaged in education for scientific information work who wishes to make a contribution is therefore invited to submit a paper for consideration. No guarantee can be given that such papers will be accepted, but it is hoped to include some of them in the programme. Papers should fall into one of the areas indicated above, and should be sent to The Education Officer, Aslib, 3 Belgrave Square, London SW1. They should be received by 1st November 1966.

Sandwich Course at Leeds

A sandwich course, designed for new entrants to scientific information work, and leading to the part one and two examinations of the Institute of Information Scientists, will begin in January 1967 at the Leeds College of Commerce. Students will enter the College in January and complete the course leading to the part one examination in June; They will be industry-based from July to December, and return to the part two examinations in June 1968.

Topics covered in the course will include work with patents, technical editing, abstracting, indexing, information retrieval, and information centre administration.

Entry requirements are a science degree, a Higher National Diploma, or an equivalent professional qualification in scientific or technical subjects.

Application forms and further details are obtainable from the Head of the

Department of Librarianship, Leeds College of Commerce, 43 Woodhouse Lane, Leeds, 2.

The College will also present a one-year course starting in September 1966 leading to an endorsement (in information administration) of the certificate for the HNC in Engineering (Civil, Electrical and Mechanical). It is intended mainly for staff in small firms which do not possess their own information departments and it is envisaged that on completion of the course the student will be qualified to handle as an auxiliary responsibility information problems arising within the firm. It is not designed to train full-time technical librarians or information scientists. The course will be given one day a week over thirty-five weeks, and will include lectures, discussions, seminars and experience in an actual information department.

COMPUTER APPLICATIONS FOR PUBLIC LIBRARIES

Proceedings of a Working Conference

Aslib, Tuesday, 21st June 1966

Chairman DR H. COBLANS
Aslib Research Department

OPENING the conference, Mr Leslie Wilson, Director of Aslib, said that he did not often have the pleasure of welcoming to Aslib a party consisting either exclusively or predominantly of public librarians; he hoped there would be more occasions in the future. Experience suggested that serious consideration of the possibility of applying computer techniques in a library or information department—the subject of the conference—usually came about in one of two ways. Sometimes it was possible to take an objective look at a library situation, analyse it and make rational decisions. Far more often the librarian was told: 'We now have a computer; use it at all costs!' He hoped that public libraries, as responsible public bodies, might be able more often than some types of organization to adopt the former procedure.

The Director explained that he had decided to invite this particular group together at this particular time for four main reasons. First, computerization of at least some aspects of library operations clearly provided the only hope of dealing effectively with the ever-increasing mass of literature, and it was vitally important to plan rationally from the start and aim at the greatest possible measure of compatibility between systems. Second, the larger the library system the greater the likelihood that computers could help; hence the invitation to representatives of the thirty to forty largest public library systems in the country. Third, it was known that many of the libraries represented were seriously considering computerization and one or two groups, such as the Computer Working Party of the Association of London Chief Librarians, were already at work. Fourth, Aslib was rapidly developing its research and consultancy services in the computer field, and he was confident that both parties to the discussion would have something to learn from each other. All those taking part would doubtless have read Dr Coblans' recent comprehensive report on the *Use of mechanised methods in documentation work* and would be as pleased as he was that Dr Coblans had consented to preside over the day's discussions.

WHAT THE PUBLIC LIBRARIAN WANTS FROM COMPUTERS

MISS G. JOHNSON, F.L.A.
Borough Librarian, Southwark

IT is of course quite impossible for me to speak for all librarians on the subject of 'What the public librarian wants from computers', although I think I should not be far wrong in saying that at the present time only a minute proportion of public librarians have given serious consideration to the applications of the computer in their libraries. Perhaps I can speak better for London librarians than for those outside London, and before I proceed with my theme I am sure that some of you would like to hear a little about what work is already being done by computers in the London public library services.

There is no doubt at all that it was because of the problems faced by some librarians as a result of the amalgamation of the London Boroughs in the major re-organisation of local government which took place in 1965 that they decided to make use of the computer for the production of their library catalogues. Each of the boroughs concerned was faced with cataloguing problems arising from the need to integrate into one manageable whole, two, three or more different catalogue systems.

In my own authority, the three metropolitan boroughs of Bermondsey, Camberwell and Southwark were amalgamated, and I was faced with the following methods of catalogue production. Bermondsey had an author union catalogue on 5 in. by 3 in. slips at the central library, and at the branch libraries there were author sequences on cards and classified manuscript shelf lists. Contrary to the general practice in public libraries of classifying books by the Dewey Decimal System, at Bermondsey the book stock was classified by Browne, and we were, and still are, faced with another major problem of reclassifying the stock by the Dewey system. The Camberwell union catalogues were maintained at the central library on 5 in. by 3 in. cards in author and classified order, junior and reference stocks being included. The branch library catalogues, also on 5 in. by 3 in. cards, were restricted to the book stocks held at the branch libraries, and these were in classified and dictionary order. At Southwark the central library held a union author catalogue of non-fiction works, junior and reference library stocks being excluded. There was no classified union catalogue. At the branch libraries there were sheaf catalogues of the branch book stocks in classified and author sequence. So you see there was a wide variety of method and format which had in some way to be integrated.

You can imagine that for some of us the only possible answer to the cataloguing problem was to adopt a new system, and an efficient solution appeared to be the production of catalogues by computer.

The present-day picture in the Greater London area is of four boroughs producing classified and author, or author and title catalogues by this method, three of these restricting their catalogues to non-fiction stocks and the fourth producing catalogues of the complete book stock of the library system.

At Barnet a complete catalogue of adult non-fiction books is produced every four months, the latest catalogue being combined with previous cumulations, thus providing a complete catalogue three times a year. This is supplemented by fortnightly cumulative lists of editions.

At Greenwich ten catalogues of adult non-fiction books are produced each year, each volume being cumulated into the previous volume as at Barnet. At the end of the year the final volumes are frozen and another set is cumulated in the following year, the final volume of which is absorbed into that of previous years; there will thus be an annual cumulation for previous years in addition to a set of current cumulations. The system at Southwark is similar to that at Greenwich, except that the catalogues are produced every four weeks.

Camden has included both fiction and junior books in its computer catalogue; opinion was divided as to the value of doing this, and some thought their inclusion unnecessary, since branch libraries normally have a copy of most fiction and juvenile works.

At Barnet and Camden catalogue entries are restricted to one line, ten places being allowed for the classification number. The Greenwich and Southwark catalogues have two-line entries which allows for greater flexibility and provides for up to fifteen classification and twenty location symbols, although only ten digits for the classification number are used at the present time; the two-line entry uses more paper, but it is claimed that the appearance of the catalogue is enhanced. All four boroughs have decided not to maintain a full bibliographical entry at their administrative centres since this information is already available in bibliographies.

Between twenty and twenty-six copies of each catalogue are printed by the four boroughs and in addition Camden prints seventeen junior copies. The Barnet and Camden catalogues are printed by Rank Xerox, but in the case of Greenwich and Southwark the computer print-out is used; the possibility is being explored, however, of photographic reproduction.

Information required for costing purposes has been allied to the programmes for computer cataloguing, and the computer is being used to obtain statistics in the BNB categories required by the Department of Education and Science, thus eliminating a tedious clerical task.

The absence of lower-case letters in these early computer catalogues is a disadvantage which it is hoped may be remedied later, when an adjustment in the computer programme should suffice.

Existing stocks can be added to the catalogues, although this is not considered to be absolutely essential since it is estimated that the greater part of any library's non-fiction stock will have run down in a matter of five or six years. Although there are only four London Libraries producing computer catalogues at the present time, there are a number of Borough Librarians in the London area who are very interested in the subject, but most sensibly they are very wary of committing themselves to this expensive new process until they are more confident that the project is worth the expenditure involved. In fact, some apprehension has been expressed at the high cost of computer methods, although the librarians already committed to computer cataloguing are unanimously agreed that its greatest value is in the provision of a union catalogue at each library in the system, and this they consider provides its justification rather than cost analysis. Moreover, the present system of cataloguing involves the use of a great part of library manpower, and computer cataloguing has achieved considerable savings in this direction.

The Borough Librarian of Camden is also experimenting with book charging by computer, and we are watching his researches into this aspect of computer applications with great interest.

I think I am right in saying that this is the extent at the present time of the London public librarians' initial experiments in the use of computers in libraries, although there are several of us whose authorities are dealing with the payment of salaries and wages by computer. We do realise that our work in this field is purely exploratory and that a tremendous amount of research needs to be done in order to enlarge our knowledge of the potential of the computer for library purposes.

The Advisory Body of Librarians for the Greater London Boroughs set up a Working Party towards the end of last year to look into the probable use of computers for both cataloguing and book charging in the new London boroughs. This Working Party has examined in great detail what is being done in the London public libraries at the present time, and in consultation with Mr Dive, the Director of the London Boroughs Management Services Unit, they looked at the possibility of formulating a scheme for co-operative cataloguing by computer; they also examined book charging methods.

Co-operative Cataloguing

In their discussions with Mr Dive the Working Party agreed that co-operative or centralized computer cataloguing should be the ultimate aim either for the Greater London area or on a Regional basis, and this was looked at in relation to the use of the BNB entries as the basis of any such centralized scheme, although some members of the Working Party thought that the LUC, or Regional catalogues, or both, would be a more suitable central agency.

The suggestion that the BNB should act as a central agency has certain obvious advantages, but a number of difficulties were also foreseen. To begin with, the use of BNB entries would have to be allied to a foolproof system for non-BNB material. Moreover, the entry required for a national bibliography would contain far greater detail than that required by most public library systems. It has been suggested that one of the problems of centralized computer cataloguing would be that all participating librarians must agree to the use of uniform catalogue entries and that this alone could take years to achieve; and although the computer is competent to suppress any items of information from the basic entry which were not required, the librarians feared that the selection process itself might lead to delays. The main doubts expressed by the Working Party of the use of the BNB for any proposed system of centralized computer cataloguing were on the question of speed of production, the great merit of the local production of these catalogues being the speed which entries can be dealt with. It was stressed by the Working Party that in any discussions on the subject very careful consideration must be given to the advantages and disadvantages of regional and local arrangements for computer cataloguing.

The Working Party is aware that the BNB, together with the principals in charge of bibliographies in a number of countries, are examining the problems of establishing an international cataloguing pool with the aid of a computer. It was considered by the Working Party, however, that this was quite a different facet of computer applications, and one of international significance, which should not be confused with the local problems that they had under consideration.

The Working Party finally concluded that, although joint arrangements for computer cataloguing might be desirable for the future, it was unlikely at present that there would be sufficient support from the London Boroughs to justify urgent consideration being given to the immediate introduction of a co-operative scheme of computer cataloguing, and that it would therefore be premature at this stage to establish a central agency for supplying data for computer catalogues. The Working Party agreed, however, that a Standing Panel of London librarians and computer experts to look at these problems was greatly to be commended, and that in the meantime individual experiments should be encouraged to ensure that a wide range of methods can be explored and their potential value assessed. The fear that piecemeal implantation will make co-operation difficult at a later stage was discounted, and it was considered that the present experiments would contribute to the solution of some of the inherent practical problems.

Computer cataloguing is only the first step in the application of computers to library processes, and it is moreover only in its very early, experimental stages, the most obvious deficiencies being in the presentation of output; our catalogues are crude and primitive and a great step forward will be achieved when it becomes possible to produce the catalogues by photo-setting techniques. We are aware that considerable research and experiment will be needed in layout, capacity and design before the final pattern emerges.

The Working Party also held discussions on the subject of book charging by computer. As I have mentioned before, Mr Maidment, the Borough Librarian of the London Borough of Camden, has been experimenting in this field.

It was unanimously agreed by the Working Party that our interest in computers should not be restricted to cataloguing and book charging and that we should aim at an integrated computer service.

I should like the computer experts to tell us whether it would be possible for a librarian whose authority owns a computer to have programmed an integrated scheme of operations by which the computer would assist him with his book selection, book orders, payment of accounts, cataloguing, orders for book binding and payment of these accounts, book charging, preparation of statistics of issues and allied statistical information, the sending out of overdue notices, book reservations, and stock control.

I can envisage the possibility of a computer handling book orders. We know that it will provide us with catalogues of our book stocks and from the data stored is able to give us analyses of our book expenditure. We know that it may be possible at some future date to use a computer for book-charging, and from this we believe may follow statistics and analyses of issues, notification to readers of overdue books and to the librarian of books long overdue which have not been returned. The possibility of using the computer for book reservations is also being explored, I believe in association with book charging by computer. One thing I would like to know is whether the record of issues for a year could be matched against the book stock, thus providing an effective way of ascertaining which books have not been in circulation during the year and a simple and effective method of exercising stock control.

Glimpses of all these possibilities have already been revealed to us in our discussions. An integrated computer system of this kind would free library staffs from much drudgery and it should be possible in the larger systems for the cost involved to be offset in some part by reductions in staff.

Some of us who are already using computers think that an integrated scheme for a library service within an authority is the most economical way of using computers in our libraries at the present stage. I would like our experts to tell us not only whether they consider that such an integrated scheme is possible, but also whether our computers, with all their other commitments, will be able to spare the time to handle this work for us without delays. I ask this because I believe that even in these early stages, there is danger of delays in the production of our catalogues because of the computers' non-library commitments. I am sure somebody is going to say that there should be a library computer on a Greater London or Regional basis, but the co-operative purchase and management of a computer for libraries by an unspecified number of London boroughs is not such a simple matter as it might appear and could well take years to achieve. Nevertheless, the idea is one which should be explored. It is quite within the bounds of possibility that we shall have Regional Government in London in the next decade, and this will be the time, in my opinion, when the exciting and practical opportunity will offer itself of introducing an integrated computer scheme for the library services of the entire Greater London area.

Another question I would like to pose the experts is whether the cost of an integrated service for a library system would be so exorbitant as to make such a service quite impossible. We know that the computer will eliminate many time-wasting clerical processes; we know that it is immensely speedy and efficient—for have we not been told that the computer is a thousand million times more powerful than the human mind, and, since the full use of the computer is still only six years old, one can imagine that its potentialities must be tremendous.

I am sure that there are many librarians who would be delighted to be able to introduce as many computer processes as possible in their libraries in order to reduce the many inevitable routine duties, but most librarians still have to watch their expenditure very closely, even more closely at the present time and in the present climate which surrounds local government expenditure. There are some librarians, indeed, who are nervous of committing themselves to an expensive standing charge which could not be reduced when economies were required.

I have touched only on the use of computers for administrative purposes and I have not looked at their use as bibliographical tools for information retrieval, so now I am going to ask you to put your heads in the clouds for a few moments. I understand that it is possible to programme a system of selective information dissemination which would match profiles of readers' interests with information profiles. An automated retrieval system of this kind must obviously be more efficient than reliance upon human memory for matching books and readers. I believe that such a system is being operated at Hursley at the IBM World Trade Laboratories in the technical and commercial library there, where a profile is made of library users' interests and requirements. Information is programmed into the core of the computer, and the relevant information profiles are matched with those of the user. From this matching, cards are printed setting out the available material and these are sent to the user, who returns them with an indication of whether the material is relevant or not to his needs. One can see the value of a scheme such as this for technical and commercial libraries.

It should also be possible to make profiles of the readers in our lending libraries and to inform them in the same way of new books on subjects of particular interest to them, thus achieving our object of bringing the right books to the right people, an aspect of public library service which has always been rather hit or miss. This is an angle on the use of computers which has been little explored, and perhaps our computer experts can tell us something of the practical and economic feasibility of the use of computers for information retrieval purposes.

It has also been suggested that catalogues could be maintained in machine-readable form, and questions addressed to the catalogue by readers through an input terminal. This would immediately appear to be a field for university or special library research since most public libraries are only likely to have the use of a computer for a few hours a week, at least in these very early stages.

Finally, may I give a very brief summary of what has gone before. Research into the use of computers for information retrieval is a tremendous field, which I think demands a Working Party devoted to this subject alone. I have spoken at some length about cataloguing by computer, since this is already being done in four London boroughs, and of the difficulties attendant upon the immediate introduction of a co-operative cataloguing scheme. I believe that book charging by computer is on its way, and that this development, allied to computer cataloguing, should make it possible to programme a fully integrated computer system for a library service.

At the present time the thinking of London Librarians on the subject of computer applications in public libraries tends to be conditioned by the immediate situation in London where a number of authorities are acquiring their own computers, either individually or in partnership with other authorities, and the chief officers are being pressed by their authorities to put forward schemes for their use in their own departments. These circumstances and the fact that some librarians are naturally apprehensive at the thought of introducing computer methods into their libraries must militate against the immediate introduction of co-operative methods, although these obviously are the ultimate aim to which we should set our sights.

DISCUSSION

Mr E. F. Ferry (County Librarian, East Suffolk) asked whether the computer-produced catalogues in London included only current editions or whether existing stock was also included.

Miss Johnson replied that at Greenwich an attempt was being made to include existing stock, in successive batches grouped by first letter of author's name. At Southwark, some existing stock was being included, and at Barnet and Camden only current additions and new editions were included.

Mr D. Leggatt (Borough Librarian, Greenwich) pointed out that a severe problem in including existing stock is the editing of catalogues prepared by different methods.

Mr R. D. Rates (Borough Librarian, Lewisham) asked for details of the numbers of staff involved in catalogue preparation before and after the introduction of computer catalogues.

Miss Johnson replied that it was not possible to give realistic figures, as the computer catalogue was introduced at the time of the amalgamation.

Mr W. A. Taylor (City Librarian, Birmingham) sought information regarding cost.

Miss Johnson quoted for the Southwark project the figure of £3,600 per year, spread over seventeen branch libraries.

Mr E. V. Corbett (Borough Librarian, Wandsworth) referred to the belief held by some librarians that catalogues in branches were unnecessary. Some preferred to use the *British National Bibliography*, and others advocated a single union catalogue, and the answering of inquiries from branches by Telex. It was doubtful if the advent of the computer catalogue justified the provision of union catalogues in every library. He had eliminated them from some libraries and did not feel justified in re-introducing them in another form.

Miss Johnson wondered whether Mr Corbett had dispensed with his union catalogues because of their high cost in staff time. Computer-produced union catalogues did not have this disadvantage. Both staff and public at Southwark were pleased with their catalogue.

BOOK ISSUE CONTROL BY COMPUTER WITHIN A LOCALLY INTEGRATED SYSTEM

W. R. MAIDMENT, F.L.A.
Borough Librarian, Camden

BEFORE we attempt to assess the merits of any book charging system, we have to be clear about what we regard as a merit. Ideas on this subject are by no means fixed, but have changed a good deal over the years. During the nineteenth century most librarians would have considered the security of public property as the most important attribute. Ledger charging, closed access and the Cotgreave indicator all followed logically from this attitude. The mass use of public libraries which developed from universal education led to a change in the librarian's values. For nearly half a century the first question to be asked about a charging system was: 'How fast is it?' Open access was a necessary change for this and other reasons and with it came the need for a rapid counter service, a need which dominated all thinking on the subject until quite recently. So much importance was attached to a speedy service that some librarians accepted systems which involved an increase in the total work to be done in their libraries for the sake of reducing the delay to readers at the counters. The Dickman system and, indeed, most delayed-discharge systems are expressions of this obsession.

The final change in the librarian's priorities in book charging has occurred only since the Second World War. Full employment has led to staffing difficulties and these, combined with a further rapid increase in the use of libraries, have forced us to seek systems offering a reduction in background work, so as to secure an overall economy in administration. Self-charging systems, punched cards, photocharging and audio-charging were all expressions of this newly desirable attribute. Computer controlled charging is the final stage of this development, since it holds out the possibility of eliminating all the clerical work and filing associated with book issues, including overdue reminders, reservation notices and so on.

There can be no doubt that data processing by computer will provide enormous savings in background work. The doubts and the difficulties all relate to the data collection system to be used. Can we get the benefits of a computerized control without sacrificing the security, accuracy and speed achieved by the best of our existing systems? This is the crux of our problem. Basically, any overall economy achieved will depend on the programme used to control the computer in manipulating the data fed to it. The other desirable attributes of a charging system: cheapness, security, accuracy and speed of service, all depend on the methods used for collecting the data at the library counters.

It may be some comfort to the non-technical librarian to point out that our existing charging systems all collect data. It would be quite possible to retain an existing system and use the information it gathers to prepare punched cards or paper tape for feeding to a computer. This means introducing an intermediate stage and thus adding to the cost and perhaps doubling the risk of human error. For maximum economy we need a system which produces a machine-readable record of book issues and returns as a primary product at the library counters. For maximum accuracy we need a system which is as nearly automatic as we can make it. The less the human operator has to do by way of copying numbers or sorting cards, the less the risk of mistakes.

For my part I would, therefore, reject the 'tag' system, which involves filing and retaining cards in an exact order, and I would also reject any direct copying system which involves operating a keyboard whilst the borrower waits. At busy times both these methods would produce an unacceptably high percentage of errors. At the other end of the scale an almost completely fool-proof system is technically feasible, but would probably prove prohibitive in cost. What I have in mind is the possibility of incorporating in the spine of each book a section of magnetic tape carrying the book number. The reader's ticket would also carry a metal strip with magnetic coding, so that the book issue procedure would consist merely of holding the ticket and the books momentarily against a suitable tape reader. The reading head would convert the numbers to electrical impulses to operate a paper tape punch for the computer input. Such a system would adequately meet all our needs for accuracy and speed and it would not be difficult to incorporate anti-theft devices to sound an alarm if any attempt were made to remove a book from the building without having it charged. I repeat that, at present, this form of perfection is likely to be prohibitively expensive, but I think it will be possible at some time in the future.

Existing equipment which may be regarded as within the budget of public libraries falls into two groups: machines which have a mechanical link between the reading head and the paper tape punch, and machines which feed the numbers from reading head to punch by electrical impulses. The first group is represented by the Olivetti RP Data Collector, which must be given serious consideration. The basic function of this unit is to convert information on punched cards into information on punched paper tape, and it can be adopted for book charging provided that book cards and readers' tickets have the appropriate numbers punched into them. Charging a book involves dropping the reader's ticket into a slot, followed by the book card or cards. The slot incorporates a reading unit which is linked mechanically to a paper tape punch and the cards emerge into a hopper from which they are restored to the reader and the books. At the return counters only the book cards are put through the machine and, in due course, paper tapes recording issues and returns can be fed to the computer.

The advantages of this system are:

a relative cheapness (£350 per machine for the simplest version);

b reliability, since the machines have been used for other purposes for some years;

c acceptable speed of service for most libraries (although slower than photocharging).

The disadvantages are:

a the large size of the cards required (40 columns);

b the punch produces square-holed tape which requires a special computer input costing about £4500. Only one such reader is required and in a large system this cost would, therefore, be spread over all the service points.

For a medium-sized library service the Olivetti Data Collector would compare reasonably with photocharging in overall cost. It would be equally accurate, nearly as fast and offers all the benefits of using the computer to eliminate behind-the-scenes routines. It also compares with photocharging in offering less assistance in intercepting reserved books than one would like. The computer can, of course, be used to print recall notices for reserved books, but for immediate interception at the counter it is necessary to use either an 'on line' system, so that the computer checks at the time of discharge, or else a reading head which converts book numbers into electrical impulses, thus giving greater flexibility.

The system developed by Elliott Automation requires only a very compact unit at the library counters. The signals are fed by cable to the punching unit which produces the paper tape. A complete installation for one service point will cost about £1500 against about £700 for the Olivetti system, but there is no additional cost for a special computer reader, as the Elliott equipment produces standard punching. For a library with less than seven service points the Elliott system would be cheaper. It is more flexible than the Olivetti and even less vulnerable to human error, since the book-card reader will not operate unless a borrower's card is also in position. The tickets are smaller and counter service is faster. It is possible to use a junction box in the circuit and a number of card readers can be used in a busy library, all operating the same punching mechanism. An additional lead from the junction box could operate a reservations interceptor which will consist of a group of latched relays set to provide a through circuit for specified numbers. Whenever a reserved book is charged or discharged the completed circuit will operate a warning light or bell.

With all electrical systems it is possible to use the computer to do the searching for 'on the spot' interception of reserved books, but this requires the data collecting unit at the library counter to be on direct line to the computer all the time the library is operating. For public libraries the administrative and technical difficulties are quite disproportionate to any possible gain. Most public librarians will base their programme on a computer owned by the library authority or a group of authorities, and the processing of library records will be carried out at a certain time allocated to the public libraries as one department of the authority; storing data for subsequent processing will probably be inevitable. It is for this reason that I have so far taken it for granted that our data collection will be on punched paper tape, which is cheap, easy to handle and sufficiently durable for the time intervals with which we are likely to be concerned. Any more permanent records required will probably be kept on magnetic tape prepared by the computer from a punched card or paper tape input.

Since I am assuming the use of a locally owned computer, I must give some consideration to the differences of practice that may arise, because not all of us will be concerned with the same size of computer or even the same make. Our concern is likely to be mainly with the input and output stages of the computer, and we need to have very little technical knowledge of what happens inside the equipment. In any case, the size of the computer, its storage capacity and its ability to handle problems will be reflected in its input and output systems. If we have some knowledge of what happens at these stages, our idea of the computer capacity will be reasonably right. The speed and accuracy of data processing within the computer do not depend upon its complexity in any real sense, since it is basically capable of dealing with very simple matters and handles complex programmes and calculations only because they can usually be broken down to a series of small tasks. Within the computer, intelligence is handled at the speed at which electric current travels, which is very near the speed of light, so that if a complex instruction is broken down even into thousands of small parts the whole operation is completed incredibly swiftly.

At the input and output stages, however, mechanical operations are likely to be needed in converting the data into electronic signals at one end and electronic signals into typed answers at the other. With the modern digital computer accuracy is very high, even at these stages of mechanical conversion, because it is not required to measure any quantitative distinctions, but simply to record a 'yes' or a 'no'. In other words, the input is arranged to avoid the gradual shading of quantities between, say, 0 and 9 and only the complete opposites, signal or no signal, have to be separated.

To make use of such a binary system to transmit intelligence, several tracks are necessary, so that patterns of the two states, signal and no signal, can be formed. An obvious comparison here is with the Morse code which, by using only two symbols, a dash and a dot, can indicate any letter of the alphabet. In a technical sense a more close comparison exists with the operation of the teleprinter, which is actuated by electrical impulses each divided into five blocks. A continuous signal for the complete impulse may be visualized as five dashes in Morse. An interrupted signal produces patterns within the block to indicate the letter or figure to be printed. With five units, enough different patterns are available to convey every letter and figure on the teleprinter keyboard, although there is no room for upper and lower-case.

If the paper tape fed to the computer is visualized as divided along its length into five tracks then across the width at any point there are five places in each of which a hole may be punched or omitted. With the five units as a pattern the computer can be fed with information as is the teleprinter. The ICT 1903 which my own borough has installed has an 8-track input and this gives a greatly increased number of patterns and codes, including different symbols for the upper and lower-case of each letter.

For book charging purposes, the information will be fed to the computer on paper tape recording borrowers' numbers and book numbers issued and returned. A day's transactions will be preceded by a code indicating the date the books were borrowed or returned, and only a very simple programme is needed to produce a record of books still on loan or of those overdue by any specified number of days. By feeding in a list of accession numbers of reserved books the identification numbers of the readers who have these books can readily be traced. In this simple version, of course, all information obtained will be in the form of numbers, and clerical staff will be needed to translate readers' numbers into names and addresses and, where necessary, book numbers into authors and titles. From what has been said about computers it will be clear that relatively small versions would handle a simple programme of this kind.

If more sophisticated data processing machines are available, the next step is to translate the borrowers' register into machine-readable form. This is not a very large undertaking for most libraries. Some editing of existing records may be needed, but most of the work is straightforward copying by a punch operator. Some libraries already have registers on punched cards which could readily be adapted for computer input. With this additional facility a substantial reduction in clerical work will be achieved, as overdue and recall notices will be printed out ready for posting. Books, of course, will be listed only by accession numbers, but for first notices this may be adequate and only for second reminders will it be necessary to translate numbers into authors and titles.

With this still relatively simple programme many dull routine tasks have been eliminated. In quite large systems half an hour's computer time each week replaces many hours of clerical work at Central and Branch libraries.

At some stage librarians will have to consider whether a simple serial number which identifies each reader is right. The sociological significance of public library use has been mentioned at conferences in recent years and some facts have been gathered by public opinion polls and other surveys. As a profession we have provided very little material for the sociologist. Statistics of books issued make no distinction between study, culture or escapism. The traditional separation of fiction and non-fiction and even book issue statistics by class do not go very far. If the borrowers' numbers were made meaningful by allocating digits to indicate age, sex, educational standard and so on, it would be possible by a computer analysis to supply the sociologist with a wealth of information. Perhaps we do not want to do this. At least we should think about it so that if we refrain we do so as a deliberate choice and not because we just did not realize the possibilities open to us.

It will by now be obvious that the final stage of developing the computer charging system is to store in machine-readable form a complete record of the book stock. If the book records are linked with the book numbers, the computer can be used to print overdue notices, including authors and titles. as fully as required. A number of problems arise at this stage. There is, of course, the obvious difficulty of dealing with existing stock. From the date of inception of a new scheme, all newly added books will be listed without difficulty as the computer file substantially replaces any existing form of accession record. The task of re-listing the stock already on the shelves at the date of change-over is bound to be a mammoth one. If the records are in a uniform type it is possible that within a few years optical readers may be available which will simplify this.

There are other complexities. If the complete stock is to be listed in machine-readable form for book charging purposes one is compelled to wonder whether it should be stored separately for cataloguing purposes. A complete, locally integrated system would require the following stages:

1 Information fed to the computer when books are ordered.
2 A complete catalogue entry with accession number, branch location, etc., fed to the computer when books are received.
3 Information fed to the computer when books are issued or returned.
4 Information fed to the computer when a copy is withdrawn.

With a sufficiently detailed programme the computer would take over the whole of stock control, issuing reminders to booksellers about outstanding orders, clearing invoices, producing catalogues and stock lists as required, dealing with overdues and reservations, and even recording books sent to the binders.

A complete system of this kind related to one library service might be difficult to integrate with any national or regional scheme for producing catalogue entries. It may be that the fundamental policy decision in computer use will lie in the choice between some form of co-operative scheme which offers a small economy in the use of professional staff, and the fully integrated, local scheme which offers a large economy in clerical staff. The attraction of a co-operative scheme is not, of course, limited to the savings in professional staff, but also offers possibilities for inter-library lending control via regional or even national computer catalogues. Even on an apparently trivial matter such as book numbers, there may be a choice to be made between local self-sufficiency and national co-operation. Locally, the need for an individual number for each copy of a book may be paramount. Nationally, a number which identifies a title may be needed and the Publishers Association is considering a scheme for such numbers, which would presumably also replace the British National Bibliography serial numbers. The comments made earlier about using significant digits in borrowers' numbers apply also to books. Some indication of subject matter by incorporating at least part of the classification symbol in the book number is an obvious advantage, but there are many other descriptors which could be applied to distinguish dates of publication, size or pagination, popular, textbook or advanced material, and so on.

It may be that the use of a locally integrated system could be reconciled with national or regional co-operation by using an additional tape as a kind of 'gearing device' to link centrally produced tapes used for catalogue print-out with locally produced accession numbers and location codes. The programme would provide a selective print-out if required for reservations, overdues, etc., where a full catalogue entry is not needed. My own view is that the locally integrated system offers so many ancillary benefits that the gains from co-operation appear to be very small. All sorts of information about book use can be obtained where there is ready access to the files. The transfer of books from open shelves to reserve stock, for instance, could be a matter of scientific analysis. Even the arrangement of the book store could be based on exact information about frequency of use. The replacement, rebinding or withdrawal of a book will be firmly based on accurate knowledge of its use and not on guesswork. There is no end to the possible uses of facts instead of guesses.

For those public librarians, and they will be the majority, who will be under pressure to make use of the computer owned by their local authority, all these processes requiring data analysis will not present any great difficulties, since few local authorities will use the full data-processing possibilities of their computers. It is already clear that the bottleneck in local authority computer rooms occurs in the use of printers. Even at 1200 lines a minute there are problems in finding time for electoral registers, rate demands, catalogues, overdue book notices, and so on. The public librarian who asks his Borough Treasurer to print catalogues from regionally or nationally produced tapes will be told that he has bought a processed article which the Treasurer would gladly have produced for him (since his computer is only 10 per cent employed on data processing) and is now asking for printer time which is over-committed.

Assuming that all the practical difficulties can be overcome or avoided, the co-operative scheme offers the possibility of a small saving in professional staff as well as the large saving in clerical or 'general division' staff achieved by the locally integrated system. The isolated local system can be expected to save over 40 per cent of the staff engaged in bibliographical services, but all the posts eliminated will be those of general division assistants. In other words, if 40 per cent of the staff in the department are chartered librarians, then two-thirds of the non-professional staff will not be needed. Savings due to a computer system of book charging are harder to estimate because I have not yet operated such a system fully, but I would not expect the number of posts to be reduced by more than 25 per cent. Again, all the savings will be in non-professional staff and those posts in this category that remain could be occupied by assistants of a much lower educational standard than we now require. We face the prospect of a widening gap between the highly skilled professional, who will staff our inquiry desks, cataloguing desks and so on, and the completely unskilled labourer, who could indeed be illiterate, as he is required only to drop cards into slots. If this kind of development is true of other professions and industries, and I think it is, we are about to face social changes and social problems of a greater magnitude than those caused by the industrial revolution. I wish I could feel that adequate thought was being given to this problem and that the impact that automation will ultimately have on our whole way of life was being examined and taken into account in all our planning for the future.

Planning and discussion of techniques and processes is, I think, being done with great energy, especially in America. Since I recently saw a reference to the possibility of international co-operation in producing catalogue entries on magnetic tape, I am inclined to wonder whether, in some areas, planning is not moving too fast for the very limited practical experience which we have. Planning too far ahead of experience can become mere dreaming. This, perhaps, is the immediate danger of stressing too much the benefits of regional, national or even international schemes. They could tempt the librarian to dream of the benefits coming within a generation from outside, and so to miss the advantages available now from local sources. What we need most is to have more librarians gaining practical experience of automation now, even on small projects. Those who are not technically minded but want to play a useful part in this revolution could do so by thinking about its effect on people. Unless we do this part of the planning, computerization may be a nightmare rather than a dream.

PROGRESS IN COMPUTER APPLICATIONS IN SOME BRITISH UNIVERSITY LIBRARIES

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MR MAIDMENT has been telling us about the use of a computer to control circulation routines in one public library system. Now I want to talk on a slightly more general level and discuss the progress that is being made in three British university libraries in using computers for routine housekeeping operations. I also want to tell you about an ICT users' group which is preparing a set of 'package' systems for libraries. But first I want to make a few comments on the place of a computer in a university today.

A university computer is used for two distinct types of task. Firstly, for scientific and mathematical work in connection with research, and secondly, for administrative data processing functions (accounting, salaries, student records, examinations, etc.). Any library use of a computer will fall into this second group.

Taking the Queen's University of Belfast as a typical example, computer operations are administered by a professor of computer science, while overall policy is determined by a Computing Committee, a sub-committee of the Senate. The department of computer science, or the computing laboratory as it may be called, may offer a formal or informal computing service to other departments who want to use the computer. This service may be limited to giving advice on particular individual problems, or, as is the case with our library project at Belfast, the service may provide complete programming effort once the initial systems analysis has been done by the user. Either form of service results in the distinctive pattern of collaboration between librarians and computing experts which is evidenced in the situations I shall talk about.

I want to mention two points, arising from the present state of computer use in a university, which must be considered by librarians in planning automated library routines, and which are also relevant to a public library system environment.

The first is the simple fact that the library must share the one computer with many other university departments. This can be a real advantage if it enables a large and powerful computer to be fully utilized, because then unit costs are lower than if a smaller computer were shared among fewer users. It is necessary, however, when sharing a computer with others to make absolutely certain that machine time is always available for library use at the times of the day, week, or year which have previously been allocated for library use. Otherwise it will become impossible to maintain the standards of service which had been claimed for that particular automated library routine.

For example, if a circulation control system employs computer time from 9 to 9.30 each morning to produce an updated listing of the total loan record, and, on one day, machine time is not available, say, until 1 p.m., then on this occasion the computer system is going to be inferior to a reasonably efficient manual system, which should have its loans file updated within a couple of hours of the library opening. Dr Ralph Shaw found that an automated circulation system at the University of Hawaii required on average three and one-third days to incorporate a loan record into the main file.[1]

In another case, because machine time was not readily available to the library, Norman Stevens found that it was necessary to wait a fortnight before reference questions could be answered by a punched card information retrieval system.[2]

The second point I want to make concerns the cost of computer systems. In a university, where a library will use only a few hours of machine time each week, it is unlikely that the cost of this time will be charged directly to the library's budget. Real costs are involved, however, and when making cost analyses of automated library systems these must be included in the reckoning, otherwise we shall obtain a falsely optimistic picture of our efficiency and economy.

Having said all this by way of introduction, and in order to strike a note of caution, let me now look at the developments that are taking place in library computing at the Universities of Newcastle upon Tyne, Southampton and Belfast.

Newcastle upon Tyne

Here an English Electric KDF computer has been used since 29th April of this year, in an automated acquisitions routine. This system has been described by Mr Maurice Line, the deputy librarian of the University of Newcastle upon Tyne.[3] It is an off-line system, similar to that described by Schultheiss in his book *Advanced data processing in the University library*.[4] The ordering procedure at Newcastle is as follows:

Firstly, proposal slips are received and checked manually in the library catalogue and in bibliographies as with the old system. This first stage in the acquisitions procedure is very difficult to automate, and generally is allowed to remain a manual, in fact a professional job.

Secondly, ordering details are punched on to paper tape using a standard tape typewriter, producing hard copy for visual verification of accuracy. Newcastle find that this input operation with the tape typewriter effects a 30 per cent saving in time over the corresponding 'input' operation of the previous system.

Thirdly, the paper tape produced is fed into the computer, which produces the following print-outs:

1 Orders to be sent to booksellers.
2 An updated weekly print-out of all outstanding orders, arranged in author order.
3 Every three months, or whenever necessary, a list of orders not fulfilled within a given period, and resulting from this.

4 Reminders to be sent to booksellers about the books which have been delayed in arriving.

A facility exists for adding to the machine record of books on order, in coded form, booksellers' reports about items which are not available, or are likely to be delayed for some reason.

Fourthly, the automated system provides for better reporting to the various university departments. Monthly balance statements and lists of books received on each fund are made and sent to the departments concerned.

Fifthly, when a book arrives it is allocated an accession number, and this, together with any other alterations (e.g. in price) is added to the machine record of the order, using the order number as a posting medium. This enables an accessions register to be produced as computer print-out, arranged by accession number, enables a weekly 'books in process' file to be created, and allows the reporting to departments which I have just mentioned.

The system has not yet been integrated with an automated cataloguing system, but the programmes are compatible with those written by Mr David Dews, librarian of the Institute of Education, and Mr Nigel Cox, Senior Research Associate in the Computing Laboratory for the manipulation of catalogue data, so that such integration may take place in future without difficulty.

Southampton

Moving on now to the second university library, Southampton, where an automated circulation system is due to be installed in October this year, as the first stage of a project which, it is hoped, will eventually include all 'housekeeping' routines. This project is being ably undertaken by the university Data Processing Officer, Mr B. A. J. McDowell, working in close co-operation with senior members of the library staff.[5]

Any library, especially a large one, contemplating a major change in a library routine, faces the problem of effecting the changeover from the old to the new system without disrupting the regular service given by the library. At Southampton, the particular problem to be solved in this connection has been to provide machine-readable book-cards, which, with similar machine-readable borrower-cards, will enable input to the circulation system to be almost entirely automatic.

The solution adopted calls for a process of gradual change, divided into four Stages, as follows:

Stage I. Here, operations start with no book-cards and no reader-cards, but book-cards are created as each book is circulated for the first time. This means that much effort on the part of readers, library staff, and data processing staff will be required. Procedures during Stage I may be described briefly as follows:

For charging, the reader fills out by hand a charge-slip, giving the book number, author, title, and classmark, his own borrower's number, and his name. This 'book number' is an accession number to which a modulus-eleven check digit has been added. The borrower's number containing a similar check digit has already been assigned to the student by the students' records department for other administrative purposes. Similar slips are also written for all returns and all reservation requests.

Data processing department staff then key-punch eighty-column cards for these slips, which are sorted off-line into book number order, and fed into a daily computer run which will produce an updated list of books on loan, a list of reserved books available, and a list of books due for recall.

From the last two lists, library staff type appropriate postcards for sending to borrowers. As a by-product of the daily computer run, a paper tape is produced containing details of books which are being circulated for the first time on the computer system. From this paper tape a book-card, edge-punched with author, title, classmark, and book number, and an adhesive label, on which the same information is printed, are automatically prepared for each book. When a book is returned from its first circulation under the new system, the edge-punched book card is inserted into a book pocket to the front of which the adhesive label is affixed. The book is now ready for the charging method described in Stage II.

Although a book-number is sufficient to identify each volume, this system includes both author, brief title, and classmark in the loan record. This will enable more informative statistical analyses to be produced, and this is regarded as sufficient justification for the extra keypunching effort and extra computer time thereby involved.

Stage I will run for one year, and in October 1967 *Stage II* will be introduced. This will be basically the same as Stage I, except that improved methods of input and output are incorporated.

Input, in the case of books that have been previously circulated during Stage I, and which will therefore have machine-readable book-cards, will be by means of a small machine at the library circulation counter. This will read the data punched into the book and reader cards, and punch it into a paper tape. The Stage I method of input, however, will be retained for books which have not previously been circulated on the mechanized system, and also, of course, for reservation requests.

Book cards and reader cards will be made from a special durable plastic material which can withstand frequent passes through the reading head of the charging machine, and can be read by this machine, even after being crumpled and folded.

Whereas Stage I simply produced lists of books due for recall, and reserved books available, Stage II will produce individual notes addressed to borrowers. This will be done by matching a magnetic tape file of books for recall, against the magnetic tape files of staff and students' names and addresses prepared for the administration departments.

Stage III, which is expected to be implemented about October 1968, replaces the daily printed list of books on loan which is supplied to the issue desk, with an on-line facility, linking a console typewriter at the library counter with a file of books on loan stored on a disc memory unit.

Input for charging, discharging, and reserve requests will remain the same as in Stage II, i.e. they will remain off-line processes, the on-line facility will be limited to answering the 'Who has what' type of question. This means that the disc file may contain a greatly abbreviated form of loan record; in fact it is expected that book number and borrower number alone will suffice for the record of each transaction. Because a shortened form of loan record is used, only a small portion, estimated at about three per cent of a disc memory unit's total capacity is required. This makes for economy, but it does mean that only one question can be addressed to the disc file, and this is a severe limitation.

A further refinement, *Stage IV*, is contemplated for this circulation system, but since this is almost identical in concept to the system that is being developed at Belfast, I shall not discuss it in detail now, but discuss the Belfast system.[6]

Belfast

Probably the most obvious difference between our approach in Belfast towards producing an automated circulation system and that adopted at Southampton lies in our method of reaching the same goal. At Southampton this goal will be reached via several preliminary off-line systems. At Belfast we plan firstly to introduce total on-line circulation control into one branch library. Then, if and when this has been shown to be a successful and economical proposition, it will be introduced into other branches, and to the main library as well.

We shall probably not have our system operational much sooner than Southampton, because we are both waiting for the manufacturer to make the necessary disc memories and multiplexors. Because we feel that an off-line system does not appear to afford any appreciable improvement over our present one-slip manual system, we are prepared to wait eighteen months to two years (and I'm estimating on the pessimistic side, here), before we introduce an automated system.

The advantage of an off-line computer system (e.g. Southampton *Stage II*) is that it would replace manual file-updating on the part of library staff by a computer run, and transfer to the computer the rather tedious task of writing postcards to borrowers, recalling books, and reporting that reserved books are now awaiting collection. On the debit side the hard copy loans file is never less than 24 hours out of date, difficulties arise in connection with identifying reserved books when they are returned,* and library staff must devote considerably more time to the charging procedure.

With an on-line system, however, the loans file is always completely up to date. No problems therefore arise with the book that is returned or reserved five minutes after it has been borrowed and, furthermore, the fact that a book which is being discharged has been reserved for another reader can be indicated automatically, immediately on discharge. All libraries in the system can also have access to the one central loan file. Individual notes to borrowers can be sent automatically as is provided for in Southampton's system after Stage I.

At Belfast, we intend to keep the entire record of each transaction on disc, so that answers can be given to a wide variety of questions in addition to the basic 'Who has what?'. Because we are omitting author and title data from the loan record, we do not expect to use much more than about three times the disc area per transaction record that is involved in Southampton's Stage III.

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*See p. 255.

Southampton will use machine-readable book and reader cards for input to the system, but we feel that similar standards of speed and accuracy of input can be realized by using a manual keyboarding technique. The hard copy print-out produced by the console typewriter will be used for verification, and we are considering the possibility of incorporating a check digit into each book number to provide for additional, automatic, verification. Our borrower numbers are constructed on the same lines as those used at Southampton, and therefore include a similar modulus-eleven check digit, because of the degree of agreement reached among university data processing officers on producing a common system for student records.

At the start of this paper I touched on the question of costing computer systems. At Belfast we have just completed a preliminary cost comparison of our existing manual system and the proposed machine system.

With the present system the cost per loan works out at 6.7*d*, including staff costs for all aspects of circulation control, but excluding stationery and overheads.

A cost of 6.0*d* per loan has been calculated for the computer system, but this figure includes only those items of hardware which will be charged to the library, i.e. one terminal, and its connections to the computer, and clerical staff time for charging and discharging. We have so far omitted costs of central processor time, disc memory space, magnetic back-up tape, and also buffer unit, multiplexor and software costs. This means, in fact, that the total real cost of the system is going to be of the order of two or three times that of the present system.

Machine system unit costs, however, are expected to decrease in the future. As the volume of circulation business increases, hardware in the library will receive heavier use, and bring down its contribution to the unit cost. Costs due to hardware in the computing laboratory will be directly proportional to the number of loans and queries, because this will be an on-line, time-sharing system. Contributions from software costs will decrease as the volume of business increases. Machine unit costs themselves are also likely to drop over the next few years. Costs of a manual system, on the other hand, are expected to rise in direct proportion to the volume of business, or even more steeply, because of rising staff costs, and increasing congestion at the circulation counter.

Finally, I want to mention the progress that has been made by a working party on university libraries, established by the ICT Scientific Users—Nineteen Hundred—Association. Mr A. G. Mackenzie, librarian of Lancaster University, is acting as convener of the working party and the other members come from the universities of Sheffield, Southampton and Belfast, and from ICT.

The group's ultimate aim will be to design a complete computerized library system with programmes written in PLAN or FORTRAN suitable for use with ICT 1900 series computers. This will be a 'package' system, whose details will have been agreed upon by members of the working party, but provision will be made to enable individual users to make modifications appropriate to their own local circumstances. In the first place off-line systems are being designed, but in such a way that on-line working could be introduced later with a minimum of change.

In order to produce results as quickly as possible, the area of library housekeeping has been divided into four sections, and each member of the working party has agreed to concentrate his efforts on producing a system design for one section.

This means that the Southampton and Belfast circulation control systems are being developed along as similar lines as possible, with the intention that they should comprise the circulation section of the 'package deal'. Dr M. F. Lynch, Senior Research Fellow at the Postgraduate School of Librarianship at Sheffield, is responsible for an ordering and accessions system, Mr Mackenzie is concentrating on serials control, while Mr David Askew of ICT has agreed to develop programmes for a cataloguing system. This will probably be the last section to be finalized, since we want to design this system so that it will be capable of accepting the machine-readable catalogue copy which we hope BNB and others will soon be supplying.

The working party met for the second time last Thursday, in Southampton, to discuss first drafts of system designs for the various sections. I think I can say that so far no startlingly new development in computer-aided library systems seems likely to originate from this working party. Nevertheless, I do expect some worthwhile achievements.

Co-operation between these four university libraries in designing common systems can only be for their ultimate good, and there are several other universities and CATs which, because they have or will have ICT 1900 computers, will be able to adopt these common systems, either in whole or in part. In addition, co-operation will mean that programming costs will be shared, and that automated systems can be designed and installed rapidly.

In my own view, the most potentially valuable aspect of the work of this group is that it proposes to make possible environments for testing the computer systems it will develop. We think that computer-aided systems will enable libraries to give better service to readers, but it is not enough merely to think. We need to know, and such knowledge will only come from such detailed and accurate measurement, testing and costing.

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DISCUSSION

In reply to a question from Mr K. Davison (Birmingham School of Librarianship) about the volume of loans at Belfast, Mr Kimber said that four to five hundred loans were made each day.

Mr G. E. Smith (County Librarian, Leicestershire) asked Mr Maidment whether he could suggest a way round the readers' habit of exchanging book cards between books, and whether he considered self-charging feasible in an automated system. He also asked Mr Kimber whether the ICT 1900 Users' Group was confined to university libraries.

Mr Maidment replied that he had not found the book card problem to be a major one in adult libraries. He was doubtful about self-charging unless checks could be incorporated to prevent borrowers from removing books without charging them. Borrowers would be slower than library staff at charging, and this could create bottlenecks at busy times. Self-charging might be feasible in places such as Holborn, where most borrowers were businessmen, but not in suburban residential areas.

Mr Kimber said that the expansion of the ICT 1900 Users' Group was not envisaged at present, but that co-operation with the public libraries' working party might be useful, especially on storage methods.

Mr D. V. Askew (ICT Ltd) commented that, at divisional level, his Region (Universities and National Research Region) of ICT covered Government and Local Authorities as well as Universities.

Mr F. Hallworth (County Librarian, Wiltshire), acknowledging that the use of terminals connected to a central computer for issues processing gave an advantage in speed, asked how many branch libraries the Belfast system served, and suggested that if there were many branches, bottlenecks could arise at the central computer.

Mr Kimber replied that at Belfast there were one main and three branch libraries, and that within the next ten years two more undergraduate libraries would be added. Bottlenecks in the computer were of no serious human consequence; the machine was so much faster than the human interrogator that the answer to a question would be received at the console within a few seconds, the exact time depending partly on the relative priority allocated to the library programmes on the computer.

Mr H. East (Aslib) remarked that when interrogating the Project MAC system at Massachusetts Institute of Technology one frequently received on the console the reply, 'WAIT'. Delays could be more than a few seconds long. It was optimistic to assume that library programmes would ever be allocated high priority on the computer.

Mr Maidment agreed that Public Libraries too could not expect very high priority on their Borough Treasurers' computers.

Mr S. Dean (Borough Librarian, Sutton) asked Mr Kimber whether he knew of any data collection machines other than those which had been mentioned, and in particular what was being used at Southampton University.

Mr Kimber replied that Southampton were using a small machine costing about £700, which produced paper tape from edge-punched book and reader cards.

Mr D. V. Askew said this machine was called the Addo 'X'.

Mr W. Tynemouth (City Librarian, Newcastle upon Tyne) remarked that a working party, with members from all types of libraries in the area, had been set up at Newcastle to consider possible computer uses, and that the necessary analysis of present systems was leading to changes even without the introduction of computers. This in itself was a valuable aspect of computer planning.

Mr W. A. Taylor (City Librarian, Birmingham) observed that although a computer charging system might show savings, there was a great and perhaps insuperable problem in the changeover to a computer system. The maximum advantage would be gained by centralizing, but this would require cards to be prepared for about a million books (in his case). This could not be done piecemeal, so it would be necessary to await the advent of an optical scanner which could utilise the information existing in the book.

Mr Maidment replied that it would be a long time before optical scanners could be used in this way. Some study of this was going on at the British Museum. It was technically feasible provided that the records were all very accurate and exactly the same form. He himself hoped to change to computer charging step by step. He described a possible method, which would make use of artificially assigned charging numbers to identify books and bridge the gap to the identification of all books in the computer. The fact that his book stock changed in about five years would help.

Mr Taylor observed that his libraries had books up to forty years old.

Mr Maidment replied that material on open shelves lasted only a few years. Reserve stock was no problem and these books could be given an accession number when they were taken out.

Mr J. R. Davies (IBM, Hursley) confirmed that optical scanners at present had difficulty in recognizing certain founts of type and handwriting. He thought that optical recognition would be practical within three years.

Mr J. A. Chaldecott (Keeper, Science Museum Library) remarked that he was experimenting with book-charging using a Flexowriter and a paper tape reader/punch, using the KDF9, a computer at the National Physical Laboratory.

Mr R. D. Rates (Borough Librarian, Lewisham) remarked that computer time was expensive and book charging involved the processing of three to four million records a year, of which perhaps 5 per cent required action as overdue books. He asked if it were not possible for loans and returns tapes to be matched without putting them into the computer, leaving the 5 per cent residue for the computer to deal with.

Mr Maidment explained that the matching of the tape records was the very thing that the computer was used for. This took up comparatively little computer time. It was printing from the computer which was time-consuming.

Mr A. Longworth (County Librarian, Lancashire) asked whether, with branches twenty miles from headquarters, he could use ordinary telephone lines to transmit the paper information.

Mr Maidment said this was possible, with a special convertor, but was not worth the trouble. He might as well collect the tapes by van once a week. In reply to further questions from Mr Longworth, he said that the Elliott reservations unit he had described in his paper would function at the branches independently of the central computer. It was reliable, and could run from batteries if the mains supply failed. He proposed to try it out at a single branch initially. This was not feasible with the Olivetti system, because of the cost.

Dr R. A. Fairthorne (Herner & Co) observed that computer storage was limited for reasons of mechanical engineering, whereas the book was a very compact and successful means of storing information. The amount of data to be stored in a public library was large. Computer storage would for a long time be limited to surrogates of books rather than the books themselves.

THE ROLE OF THE BRITISH NATIONAL BIBLIOGRAPHY IN THE APPLICATION OF COMPUTERS TO PUBLIC LIBRARY SYSTEMS

A. J. WELLS, F.L.A.
British National Bibliography

TWO papers this morning, both putting the public library point of view, have thrown doubt on the wisdom of using a central cataloguing agency, such as the British National Bibliography, in local library computer systems. Miss Johnson discussed four or five difficulties which she thought would militate against a national central agency, though she seemed to think that a regional central agency might not suffer from these difficulties, while Mr Maidment declared that it was easier to make local arrangements to meet local requirements than to try to integrate local systems with a national or perhaps international organization.

I believe my paper will go some way towards providing answers to Miss Johnson's points. With regard to Mr Maidment's statement, I think it may well be true that, particularly in the present uncertain situation, it is easier to make local arrangements, but it is my view that we should beware of setting up incompatible local systems even at this stage. If we are not careful we shall leave behind us a chaotic situation just as bad as that which faces us today, the very situation, in fact, which has made the production of union catalogues so difficult in our time and which is the cause of the problems which face you in the Greater London Boroughs at the moment. I should have thought that this would have served as a warning to us and made us determined this time to strive at all costs for compatibility of methods.

I find myself in some difficulty in presenting a paper here, as it is very clear that many of you have far more experience of the application of computers than I, and because, apart from a very brief preliminary investigation undertaken by Aslib's computer research staff into the feasibility of producing the *British National Bibliography* by computer, little actual work has been done.

I shall begin by briefly reviewing the success and failure of the British National Bibliography as a central cataloguing agency using conventional printing and publication methods. I believe that this will help us to understand some of the basic requirements of a central cataloguing agency using computer-assisted production methods. I shall indicate, as far as I am able at this point in time, the probable plans for using computer techniques in the production of the *British National Bibliography* and try to suggest ways in which the work of the British National Bibliography might be used by individual libraries.

When the British National Bibliography was established in 1949 it was the hope of many of us that it would develop into the central agency for the provision of cataloguing data either in the form of printed cards or by the provision of cataloguing information in its publications.

Librarians had been conscious for a long time of the apparent duplication of effort entailed in cataloguing current British publications in individual libraries up and down the country and the consequent lack of qualified staff for other duties. There also seemed virtues in the very standardization which a centralized cataloguing service would impose. We are all aware, for example, of the problems involved in forming union catalogues from entries prepared according to different standards. (Some of you have had recent experience of this.) It also seemed desirable from the point of view of the library user himself, that there should be standardization of cataloguing, classification and subject indexing.

The British National Bibliography looked as if it might have provided these advantages. Yet today, sixteen years after its inception and ten years after the introduction of printed catalogue cards, there is almost as much diversity in our methods as before.

The reasons for this are probably better known to you than to me. They include:

1 *Incompatibility of entries.* Libraries discovered that, owing to differences in the application of cataloguing codes, headings already in use in their catalogues differed from those chosen by the BNB. In addition the BNB entry was fuller than their own and the information was not always given in the same order as in their own entries.

These matters, it seems to me, should not have proved a barrier to the use of the BNB entries, though there is evidence that they did. This was in some cases because it was felt that the fuller entry would mislead library users and in others merely because differences in detail offended against a purist desire for complete uniformity within the local catalogue.

The more serious problem is the variation in the choice and form of main entry heading. In spite of the fact that most British public libraries catalogue according to the 1908 *Anglo-American Code,* the differences arising from its application have proved a serious barrier to co-operation.

It is my view that attempts to compile national union catalogues on the basis of the so-called author entry are bound to prove difficult. They are based on the assumption that it is possible to lay down a set of rules which will provide for an unequivocal choice of heading for every book not only by any cataloguer trained in their use—itself a doubtful proposition—but by any Tom, Dick and Harry who comes to his library with a request for a book. This assumption ignores the elementary fact that title pages are not laid out to give an unequivocal main entry (author) heading. A catalogue for general use must be a multi-access medium—such as the *British National Bibliography.* A union catalogue, on the other hand, being a locating device, requires only one entry under some distinctive and easily obtainable factor. For economy this should preferably be an identification number. In some Regional Bureaux, the BNB serial number is used for this purpose for those British books recorded in the *British National Bibliography.* It seems to me that we should be concentrating our efforts on the problem of providing an identification number for all books. Even if the problem of numbering existing books presents difficulties, we should at least be taking steps to ensure that new publications are numbered.

2 *Incompatibility of classification.* Most British public libraries used an edition of the *Decimal Classification* for the arrangement of their books and, in many cases, of their catalogues. But, as with the application of the A-A Code, the results produced by different libraries in applying the *Decimal Classification* varied widely.

It is true that the classification policy of the British National Bibliography has been the subject of more controversy than any other aspect of its work. I am convinced that, whatever policy we had adopted, we would not have provided class numbers that concorded with those already in use in library catalogues. British libraries had had too many years of independent growth for compatibility in this, as in the choice of heading for the main entry, to be possible.

3 *Lack of tracings.* It is possible that, if the British National Bibliography had been able to provide tracings for book index entries and subject headings, it might have been more widely used as a cataloguing service. Or might this have turned out to be yet one more field where diversity was too prevalent for any reasonable degree of compatibility?

4 *BNB's entries met only part of the cataloguing needs of a library.* This, of course, was particularly true of the earlier years, but it continues to be true to some extent, because *BNB's* coverage is limited to British books and to relatively current British books at that. In addition, its policy in regard to Government publications is selective. This partial coverage forces a library to maintain a cataloguing staff to deal with those items falling outside the scope of the British National Bibliography.

5 As far as the Card Service is concerned, the chore of searching for serial numbers before cards can be ordered militates against the use of the service.

6 The interval of time between the purchase of a book and the publication of a printed entry or the arrival of printed cards results in a slowing down rather than a speeding up, of the cataloguing process.

Because of these difficulties, the value of a centralized cataloguing service seems rather slender and the question inevitably arises as to whether centralized cataloguing is not a myth.

To any outsider, looking at the country's cataloguing processes as a whole, it must seem that a solution to our problems lies along the path of standardization of cataloguing, classification and subject indexing procedures. The issues are not quite so simple, however, because every individual library catalogue is a set of inter-related units, not all of which have come from the same cataloguing source.

Nevertheless, in view of the large investments both of time and money which are being contemplated at this time both in computer programmes and in machines, it seems to me imperative that we should take another look at the prospects of setting up a centralized cataloguing service which could effectively meet the needs of local librarians.

The prospect now before us is of a *machine-readable* catalogue entry provided by a central agency such as the British National Bibliography—an entry so designed that, given a suitable programme and a suitable computer, a library could compile and print-out its own catalogues and use the entry for stock-keeping or as a store for direct computer interrogation.

This service, I need hardly say, does not exist yet, but it is within the bounds of possibility that BNB entries could be available on magnetic tape within a year or so. A study has already been made of the operations now being carried out in the production of the *British National Bibliography* and it is clear from experiments undertaken elsewhere in this country and abroad that all operations are within the competence of existing equipment.

Much has already been done by the Library of Congress and the Britsh Museum in re-evaluating the information which needs to be included in a book description (i.e. catalogue entry) and in designing a suitable layout or format for a machine-readable catalogue entry.

The British National Bibliography would be able to take advantage of the work already done. Indeed, it will be our object to use a format which is compatible with that used by the British Museum, the Library of Congress and other major libraries in this country.

It may well be that the BNB entry will contain more information than is required by public libraries, but it would not appear difficult to design a simple programme for reproducing only that part of the information wanted.

The Library of Congress is expecting to begin issuing catalogue entries on magnetic tapes to a selected number of libraries in the autumn of this year. If these experiments are successful, there seems little to prevent a rapid development of the project.

The British National Bibliography's own problems are not limited to the production of a machine-readable catalogue entry. We have also to solve problems of subject indexing as well as those of generating, alphabetizing and merging book index entries. It is likely to be some time before all the problems involved in producing the *British National Bibliography* are solved, but once agreement has been reached between the British National Bibliography and the other major libraries on the information to be included in a book description and on the format for a machine-readable catalogue entry—and this is likely to be reasonably soon—it would be possible for the British National Bibliography to begin the production of taped entries by substituting tape-typewriters for its present conventional typewriters. This could be done without interfering for the moment with the existing FotoList production processes.

The entry thus transferred to tape would be a full catalogue entry. Unlike the Camden and Barnet schemes, in which entries are a series of fixed fields, thus limiting the amount of information that can be placed in any one field, the BNB entry would consist mainly of variable fields. The fields would be tagged so that they could be located and identified by the computer. As I have already suggested, by using a suitable programme it should be possible, if desired, to produce simplified entries for use in public library catalogues.

It would be our intention from the start to give tracings for alternative headings, though I do not think it likely that we would offer *subject* headings in the first instance. A great deal of work has still to be done on subject headings for computers and we would expect to tackle first the simpler task of compiling a store of subject index entries for a classified catalogue.

I would expect that machine-readable entries with tracings, coming off as a by-product of a typing process, should be available two to three weeks before the appearance of the entry in the printed pages of the *British National Bibliography*. This improvement in the time schedule should go a long way to overcome the present objection to the late appearance of entries.

In addition there is a strong move in the book trade to provide, either at source or before publication, a book number for all British publications. The object would be to publish the number in and on the book itself and to quote it in all pre-publication notices and reviews, in trade bibliographies, such as *British Books in Print,* as well as in the *British National Bibliography.* If this scheme gets off the ground—and there seem good hopes of a fairly early start—the time-taking chore of searching for a BNB serial number would ultimately disappear.

In view of all this, it does seem that centralized cataloguing based on machine-readable data would not have the disadvantages of existing printed card services. Would it not be reasonable, therefore, to investigate the feasibility of using the British National Bibliography as a central agency before committing oneself to an individual programme? The proliferation of individual programmes would inevitably lead to the kind of chaos and incompatibility we have in our manual catalogues today. It could tie us for years to a print-out that is at best unpleasant, and limit us to the unnecessary restrictions of fixed fields.

I realize that I have not much to offer at the moment, but this seems to me to be the opportunity to design a centralized cataloguing service, from the start, the way we want it. It is an opportunity, too, to bring greater uniformity into local practices. I do not think that we should let it slip through our hands.

I know that there are problems for the local library which are outside the projected scheme of the British National Bibliography. Many of you have the problem of merging existing catalogues for which the British National Bibliography's current service would not provide. We at BNB shall have long-term plans to put the whole of the *British National Bibliography* back to 1950 on tape, although it is not possible at this moment to say when this might be. There are questions of compatibility of computers and of programmes to be solved.

I know that these are not small problems, but, at the risk of repeating myself, I would say again that, if we all begin going our own ways now, we shall regret it later as much as we regret the present chaotic situation. We must make a determined effort to co-ordinate and standardize our cataloguing practices, because we stand, at this moment, on the threshold of great changes and great opportunities.

DISCUSSION

Mr I. A. Crawley (City Librarian, Belfast) considered it an important question whether computers should be used for integrated central services or whether they should be locally oriented. He felt the latter course should be followed; he wanted computers to do housekeeping chores accurately, and this suggested integration with the Borough Treasurer's department rather than with a national cataloguing agency. His libraries had tested central cataloguing by trying to use BNB cards, and had failed because BNB has to think in general terms, whereas cataloguing for a library is a by-product of the maintenance of that library.

Mr B. C. Vickery (Librarian, Institute of Science and Technology, Manchester University) pointed out that there was no conflict between the two kinds of centralization. What Mr Wells was suggesting was that one particular input could be provided by a central agency

Mr W. A. Taylor (City Librarian, Birmingham) suggested that if a local library could indicate to BNB its purchases and their locations, BNB might be able to provide custom-made tapes; he asked if BNB would do this.

Mr Wells replied that the detail of the possible BNB service was as yet undecided, but that they would consider offering a service providing selected entries.

Mr E. V. Corbett (Borough Librarian, Wandsworth) asked how a tape provided by BNB could be adapted to local use.

Mr Wells said that there were three possible methods. BNB could sell to libraries the whole of its weekly tape each week, and local libraries would select material by means of their own computer programmes. On the other hand, BNB could supply reproductions in full of the entries requested by libraries. Thirdly, and perhaps best, libraries might agree on the form of simplified entry which they would require, and BNB could produce a tape containing entries in this simplified form.

Mr Corbett asked how this would replace libraries' own cumulations?

Mr Wells replied that it would not do so; it would merely provide one element of the input.

Miss Johnson remarked that the difficulty of co-operative cataloguing in London was a practical one, there being thirty-two different library authorities. When it became possible, the method of establishing a central agency must be carefully considered. The fears of the Working Party were on the score of possible delays in cataloguing. She was pleased to hear of the proposed improvement in BNB's schedules.

Mr R. D. Rates (Borough Librarian, Lewisham) asked whether it would be possible for the tapes provided by BNB to be cleared of entries which libraries did not require, and whether branch locations could be added to the tape records.

Mr Wells hoped that this would be possible. Mr H. East (Aslib) confirmed that it would be.

Mr K. Davison (Birmingham School of Librarianship) pointed out that tapes written by one computer were not necessarily readable by a different one, and that this could create difficulties. If a central agency were to produce a standard tape, manufacturers might feel a greater pressure to achieve compatibility, which they considered at present to be not worth their while.

Mr W. Tynemouth (City Librarian, Newcastle upon Tyne) observed that the prime purpose of a library user was to obtain a book or some information. Availability of books on the shelves and of staff to help find them was of first importance. Only if the librarian could not supply the book to the reader did catalogue searching take place in order to locate a copy. He asked whether Mr Wells could visualize the BNB service incorporating an easily identifiable and searchable key.

Mr Wells replied that he hoped that the publishers' proposed book number, perhaps with the additions of locations, might serve.

Miss J. M. Plaister (Director, South Eastern Regional Library) thought that a regional computer-held catalogue with codes added might be the answer. This could also provide tapes for books not included in BNB. Once the tape entry was made, another library could use it.

Mr Rates suggested that the true topic of discussion was not merely a catalogue but an entry, for which there were more uses than the mere listing of holdings.

Mr Dive pointed out that BNB tapes would contain records of about 2000 books each month. At 500 characters per entry, this would occupy only one-twelfth of a reel of magnetic tape, which could easily be processed, even in full.

Mr C.D. Batty (College of Librarianship, Wales) maintained that a bibliographic tool, which was a complete catalogue of all books published, should not be confused with a library catalogue, which pertained to an individual library. With regard to the criticism of a centrally produced catalogue as too general for local use, he asked what principle was involved here.

Mr Crawley thought it was a question of sequence. BNB was a bibliographic tool, used for selecting books before their acquisition, not a cataloguing system for locating books on the shelves. Information on book locations should be collected by a regional bureau. It was the attempt to use BNB as a processing tool which created difficulty.

Mr Harris (West Sussex County Libraries) asked for confirmation that variable fields could be used in the computer files.

Mr H. East (Aslib) said that it was convenient for the programmer if fixed fields could be used, but in a complex entry such as those in BNB it was desirable to use variable fields.

Mr Wells said that variable fields could be used provided they were tagged.

Mr J. C. Downing (BNB) brought to the notice of the meeting the existence of a working party on computer filing, of which Mr Davison was the chairman. The working party was trying to develop, in co-operation with national Standards Institutions, a draft code for computer filing of catalogue information. He appealed to those present for their co-operation.

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ORGANIZATION AND PRACTICAL ASPECTS OF COMPUTER USE

H. J. DIVE
Director, London Boroughs' Management Services Unit

Introduction

I WOULD like briefly to call to our minds one or two of the important practical features which concern us when we think about the use of computers in libraries. Perhaps, however, I should start with a disclaimer: I am not about to present you with a neatly packaged solution to your problems. I do not have one and I do not believe anyone else has at this moment. But I am certain that computer technology must have a fundamental role to play in any solution.

I say your problems as if I knew exactly what they were. I wish that were so, for the first vital step in the solution of any problem is its proper identification. Nevertheless, it is clear that what one might term 'the information explosion' producing an ever-increasing volume of published material which is concerned with a constantly expanding range of subjects, is the main spur to action.

As far as the potential use of computers is concerned, there seem to me to be six requirements:

a storage of very large quantities of material in machine-readable form;
b storage of even larger quantities of graphic material in a format suitable for fast, easy manipulation;
c retrieval of the actual items—books, magazines, etc.;
d communication with users and with other libraries—catalogue content, etc.;
e dissemination of bibliographical information in printed form;
f routine data processing applications in record keeping and general housekeeping, e.g. serial control, payment of suppliers, etc.

To define the problems more closely and the exact role of the computer would require detailed systems analysis, involving a corporate effort on the part of librarians and computer specialists. My experience in other computer applications, however, compels me to make one thing quite clear to you: this detailed analysis is not easy; it is a question of man-years and not of man-months; it involves a complete consideration of the function of a library now and in the foreseeable future, the definition of objectives and the definition of the relevant constraints, particularly cost and timescale. Where I hope to be of some assistance today is in describing some particular aspects of computers which must be considered.

Aspects of Computer Use

Storage

If we consider developments in computer storage, the history is one of continuous improvement in reliability and in capacity. In spite of these improvements in capacity it is still necessary (because of the high costs) to assume that there will be two kinds of storage: a main memory with an extremely fast access time (e.g. 1 microsecond per character of information) and a backing store. The main memory will almost certainly be of magnetic cores and in this context 256,000 characters would be regarded as an extremely large memory; the backing store would be of very much slower access and not necessarily all available to the computer without operator intervention. To give you some examples:

- *a* A punched card has capacity of 80 characters;
- *b* A magnetic disc can contain of the order of 7¼ million characters;
- *c* A magnetic tape can contain about 12 million characters (150,000 times that of the card);
- *d* A magnetic card file (IBM Data Cell Drive or ICT/EELM magnetic card file) can hold about 340 million characters.

With any of these media the amount of backing store which could be made available directly linked to the computer would depend on the number and types of peripheral units which were associated with it. The speed of access to particular parts of that store would be enormously variable. It is much slower with the serial media such as cards and tape, where each item preceding the one required must first be read, than on the random devices where access is selective and of the order of ⅓ second.

Now just what does this storage potential mean in the context of library requirements? I have estimated that an average book (about 340 pages, 80 lines/page, 70 characters/line) consists of about 1.2 million characters, whilst one as big as the Bible, for example, requires some 4¼ million characters. Thus the magnetic card file could accommodate some 283 books, and the magnetic tape nearly 3 Bibles. It is quite obvious that it just is not practicable (even if it were desirable) to hold the complete library stock in machine-readable form. One magnetic tape alone, however, could hold 240 characters worth of catalogue information for each of 50,000 books, whilst a large random access device on the same basis of 240 characters would hold enough for 1,400,000 books. With figures of this order in mind, it is apparent that a file containing details of readers, which for a large library series might be 1½ million characters, is a trivial problem. The figures which I have just given you illustrate just how apposite Dr Fairthorne's cautionary remarks were.*

It is thus clear that the potential for holding information will already cover anything that may be required for index searching and routine processing, but there is a definite need for the development of microfilm-like storage to hold that part (selected pages, contents, index, etc.) of the actual total material holding which it might be useful to display via a computer search. These are, of course, essential for information retrieval when we embark on this future phase of library development.

*See p. 262.

Input

The use of punched cards or punched paper tape as input media is, of course, well established in the computer field, and these media are quite suitable for some of the input data which is required. The snags arise from the need to employ staff to punch from raw data and the possibilities of error which this introduces; thus the emphasis which was so prominent a part of our discussion this morning is on the need to capture data at source. We seek to produce punched cards or paper tape as a by-product of some other necessary operation. A practical example of this is the punching of paper tape automatically by cash registers which record the payment of rate demands produced and despatched from the computer centre in South-East London. Each day the paper tape is read by the computer which updates its records from this information, so providing a 'looped' system which does not need the intervention of clerical records. During the production of the paper tape, the account numbers are automatically checked for conformity with a special set of check digit rules by further specialized equipment, and wrong numbers are detected before any punching occurs. Such equipment is expensive and probably out of the question where a large number of service points exists.

If we consider the special requirements of libraries—and you will recall Mr Maidment's description of his experiments and the discussion which followed—one of the major problems is to capture the information concerning book issues and returns. It is often a problem of a large number of service points and sometimes with severe queuing problems of the kind which have forced the use of the 'token' system. The need to compete economically with one of the best manual systems ever devised, the Brown system, also presents a major constraint. This circulation problem is one which merits a great deal of further study.

As far as information relating to the acutal material in the library is concerned, it is to be hoped that, for new publications at least, the main body of any catalogue entry will be made available in computer usable form to those major libraries or groups of libraries with computer facilities. Ideally this would be on magnetic tape, but there are many problems of compatibility to be overcome, since unfortunately it is often just not possible to read one manufacturer's magnetic tape on another's computer. Even where it is possible, special programmes will almost certainly be required since the codes corresponding to individual characters will be different and will require to be translated.

When the possibilities of direct access from a library to a computer are considered (a topic to which I shall return later), it is clear that this will necessitate the use of keyboard input. These keyboards would probably be used mainly by the library staff, but detailed study should be done to see how far it is possible to produce a console simple enough for the public to use.

Output

It is when we consider the problems of output that the present limitations of computers are most apparent. What we have is high speed but poor readability—speeds of the order of 1,000/lines minute, but with restricted character range, e.g. 48 to 64 characters are commonly encountered. There is no upper-case (with the exception of a special printer produced by IBM) and no variety of type styles, weights or sizes.

This computer print-out is perfectly acceptable for such results as overdue notices and low-volume results with a limited distribution, but it is not really very satisfactory for general use. For the dissemination of compact results in a variety of type founts and sizes, making for ease of legibility and rapid scanning, it will be desirable to use computer output to actuate printing equipment. Photocomposing equipment is the most likely in this context, and it is desirable that it should be possible to print directly from magnetic tape. This is technically feasible at the moment, with such devices as the Lumitype 901 ZIP which is capable of setting over a million characters an hour, but with capital costs of the order of £100,000 it is extremely unlikely that this equipment could be used other than on a service basis or as a joint purchase by a number of libraries.

For a very small volume output (e.g. a simple answer to the question whether a particular book is in the library or not), the input console I referred to previously would probably also operate as a simple teleprinter. For more complex interactions between the console user and the library data processing system (e.g. in a search of a section of the catalogue) it will be necessary to have some form of visual display, possibly a cathode ray tube similar to a television screen.

Data transmission

I have said enough under the headings 'input' and 'output' to indicate my conviction that the large library system of the future will involve the use of data links. In an automated system an enormous amount of information will be concentrated in a few machines, and facilities for data transmission are the way in which flexibility in use can be maintained through a large number of service points.

On the simplest level the data links could be no more than a telex network, comparable to those already in use in some existing libraries, e.g. Bucks. Such a system is known as an 'off-line' system, in that it does not involve a direct link to a computer, although, of course, some of the results fed through the network may be computer-produced and indeed the paper tape producing particular messages may have been punched by a computer. A telex installation fitted for transmission and reception of any five-hole punched paper tape costs £300 a year to rent, and calls are charged in 2*d* units, for which one minute's transmission time can be obtained if the telex centres are less than thirty-five miles apart.

As far as on-line access is concerned (and it is such a system which is envisaged when one talks of interrogation consoles with visual display output), the requirement is for a very powerful multi-programming computer. Multi-programming means the ability to run a number of programmes at the same time, and this is needed in order to allow the interruption of whatever job is running on the computer at the time that an inquiry is received, to obtain the information necessary to answer the inquiry (probably from one of the large random access stores previously mentioned) and to cope with further enquiries coming in while this is all going on. Enough storage space is needed to be able to form an internal queue of callers requiring attention and to store information which is being transmitted. Fairly fast processing speeds are required if a large number of out-stations are to be serviced without undue delay in answering, e.g. one of the new English-Electric systems recently announced is said to be able to service up to 280 stations. At the moment visual display units of the type required cost of the order of £5000, but these prices must come down in future as the demand for such equipment grows. The actual cost of the data transmission equipment varies considerably according to the computer configuration, and it is necessary to rent a special Post Office Modem (Modulator—Demodulator) at between £120 and £150 per annum in conjunction with each terminal. A fast modern computer having the desired communication facilities and large scale backing-store would certainly cost in the region of £350,000.

The conversion problem

As was stressed this morning, one problem which is rarely given sufficient attention when a change to a computer system is envisaged is that of converting existing records. The Americans have given considerable thought to this problem and calculated that in the case of their National Union Catalogue (which contains some fifteen million cards with an average of fifty words on each) if the whole file were keypunched and verified the complete conversion would cost at least $7.5 million (i.e. over £2½ million). Even that figure may not allow for sufficient manual editing and correction of original data errors.

The staffing problem

I have already said that the task of systems analyses and programming is not easy. The cost of 'software' has been estimated as equal to the cost of the hardware by Mr F. J. Laver, Head of the Ministry of Technology's Computer Division, and I am sure that if further informed comment were invited on this point the only possible disagreement which would be expressed is that his estimate is on the low side.

In our case, for example, the development of a computer system for rate billing and accounting took over ten man-years, whilst the work involved in our completely integrated expenditure accounting system has been more like fifty man-years.

These figures may sound almost alarming, but they must be faced. There is no touchstone but hard work for success in computer application. However, once achieved, these effective and practical systems can be implemented subsequently with much greater economy of effort.

When this kind of timescale is considered in the context of the further problem of the general shortage of specialized computer staff which already exists and which is being further aggravated by the rapid rate of expansion in the application of computer technology, the organizational and practical importance of the staffing problem becomes clear.

Conclusions

In this perforce very rapid survey I have attempted to demonstrate firstly that in the present state of computer developments it is already feasible to tackle the problems of library automation and indicate some of the problems which must be solved.

If I may be permitted to conclude with some recommendations as to future action, I would urge that:

a Firstly, in view of the likely costs, the staffing problems and the need for fundamental thinking, a determined attempt should be made to co-ordinate the main effort and to undertake joint study and research on the problems.

b Secondly, to cope with the problem of file conversion and of keeping up with the ever-increasing volume of published output, urgent attention should be given to the need for some central facility for the speedy dissemination of bibliographical information in machine readable form in addition to the printed lists and cards which already exist. Further attention should also be given to the extension of the coverage of BNB, and I would like to support Mr Wells in his previous remarks concerning this topic. The current impetus from the Publishers Association towards a system of unique book numbers for new publications is also worthy of strong support.

c Thirdly, although there is a need for experiment, this should be controlled and duplication of effort should be avoided.

DISCUSSION

Mr W. A. Taylor said that his file of readers contained 300,000 names and addresses, totalling about fifteen million characters, and changed daily. It would take up more than one disc or tape. He asked how much the constant updating of this file on a random access medium would cost.

Mr D. A. Schartau (Chief Systems Analyst, London Boroughs) said that it was impossible to answer this question without information about the particular installation and its tasks. The problem of updating the file was trivial. He suspected that the file size quoted could be substantially reduced by (for example) grouping by street headings. Mr Maidment said that he intended to make his reader file sequential. Mr Schartau commented that whether a random access file was necessary depended on what it was to be used for. If the activity of the file was low, random access might be more convenient.

Mr E. V. Corbett drew attention to the difficulty of obtaining estimates of the benefits and (particularly) the costs of computer methods. Comparisons were of limited value, as the same methods might cost more in staff in one library than in another, depending on the distribution of tasks.

Mr Dive said that no direct comparison was possible between a present situation and a situation after computer use had been introduced, since the computer bestowed advantages which would not otherwise be obtained.

Mr Maidment said that his Borough Treasurer estimated that his libraries had saved £3000 in the first year of computer operation, even though a rented machine was used.

Mr C. D. Batty (College of Librarianship, Wales) remarked that so many possibilities arose with the use of computers that it was necessary to ensure that the right things were being done. Work should proceed piecemeal, with careful consideration of what the users of the libraries, rather than the librarians, wanted.

Mr B. C. Vickery (Manchester University) pointed out that with long practice many manual systems had reached a high degree of efficiency. With a computer, however, new things could be done. It was desirable to try to evaluate these benefits, rather than regard the computer merely as a means of saving money on existing tasks.

Mr D. V. Askew (ICT) wished to know librarians' views on the topic of upper- and lower-case character sets.

Mr D. A. Schartau remarked that computer print-out was trying to the eye on account not only of the lack of lower-case letters but also of the uniform density of type.

Mr K. Davison (School of Librarianship, Birmingham) referred to the work being done at Newcastle by Mr Duncan in conjunction with the Newcastle Library School, and the Chairman remarked on the need for more research into the problem of legibility. Not only lower-case, but a whole range of symbols were necessary. Dr Fairthorne said that in the USA there was pressure for a proper character repertoire, not only from librarians but from all quarters. Mr East pointed out that better-quality printing would be an added cost.

Mr G. E. Smith (County Librarian, Liecestershire) suggested that there was scope for co-operation between libraries in the matter of conversion of catalogues to machine form. If one library with a large stock got its stock record on to tape, others might merely amend this tape on their own computer.

Mr Schartau pointed out that problems would arise in referencing the file. He suggested that it was best to look after the future first, and give past files only secondary consideration.

Miss J. M. Plaister (Director, SERLS) commented that IBM had quoted a price of £250,000 for the conversion of her library's catalogue, containing nine million entries, to machine-readable form.

Mr W. H. S. Ashmore (Borough Librarian, Harrow) summed up, at the Chairman's request, as follows:

The official speakers and the audience at this Conference were selected to provide a group of people with some background knowledge of computer systems and their possible applications in libraries. Throughout the sessions, it became apparent that many were involved in asking fundamental questions. Mr Dive, for example, described the potentialities and some of the main points in assessing modern computers. The speakers who followed were asking the basic questions: 'What am I trying to do in the Library for the benefit of the user? How will a computer help me?' By tacit approval of the meeting, the larger problems of information retrieval, which may take longer to resolve and could be regarded as a second stage, were not dealt with. The discussions centred, therefore, on so-called 'housekeeping applications': acquisition, cataloguing, circulation, movement of stock, etc. One very great difficulty for public librarians was also mentioned by the county representatives present: the problems for a library authority with a very large number of small service points. Significantly, the first developments may come in large and medium-sized systems.

At another stage in the Conference, some speakers questioned the advisability of pressing on with local schemes; they felt that the nature of computer work suggests large areas of co-operation—regional, national or international. Mr Wells' session posed this particular problem. The dilemma here, perhaps, is that experimenters and pace-setters are needed to explore the techniques, but one hopes that this will not produce a permanent set of different methods and that more co-operation and standardization than has been customary in the past will ultimately prevail.

Librarians who had started local schemes described these in some detail, and they described the catalogues of the four London systems and possible future development in the field of issue methods. Developments in three universities were also discussed, the emphasis in this case being on the solution of circulation problems.

During these sessions, details were given of the relative merits, costs, etc., of various machines and ancillaries (the Olivetti card-tape convertors for example, being compared with the Elliott-Automation system, or off-line with on-line contact with the computer centre). This emphasized that the more complex and sophisticated machines become, the more careful our investigation of them has to be.

The whole Conference was not only most enjoyable, but was also a very valuable interchange of information between Aslib staff, representatives of commercial firms, Library School lecturers and public librarians.

Letter to the Editor

CITATIONS

Dear Sir,

In these days of increasing use of citation indexes, which permit following trails from original sources, it is important that documentation journals require their authors to cite basic references with their papers. This is also the scholarly practice. In *Aslib Proceedings* for June 1966, N. W. Woods' succinct paper on 'Abstracts and their indexes—style, presentation and use' should have cited (at least) papers by Weil and colleagues, Brenner, and Friedenstein for a large part of the information on abstracting, and Luhn and others for the information on KWIC. The text references to Hindson, National Electronics Research Council, Wright and Wilson, P. B. Baxendale, and the American Institute of Aeronautics and Astronautics were largely devoid of reference information; moreover, these are largely secondary references and/or relative latecomers.

I am delighted to see many good ideas synergistically repeated in Woods' paper. Users would have benefited further if the more-detailed sources for many of these had been cited directly.

Very truly yours,

B. H. WEIL

Esso Research and Engineering Company,
Technical Information Division,
PO Box 51,
Linden,
New Jersey,
USA.
12th August 1966.

Mr Wood replies: I would like to point out that the works to which Mr Weil refers were not directly consulted in the preparation of my paper, and it was for this reason alone that they were not cited. I would agree, however, that a bibliography appended to any article undoubtedly enhances its value, not only to the user and compiler of citation indexes, but also to any serious reader or literature searcher. It is in the light of this that we may have to reconsider our usual practices and adopt the more scholarly practice at all times. Perhaps this could be implemented by editors insisting on the addition of a bibliography as a condition of acceptance for publication.

SELECTIONS FROM THE RECENT LITERATURE†

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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†The Library is interested in enlarging its collection of guides to libraries. Any samples would be gratefully received by the Librarian.

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TRANSLATIONS FROM TURKISH. All subjects. F. P. Scott, 4 Uphill Grove, Mill Hill, London NW7.

TRANSLATIONS: TECHNICAL, SCIENTIFIC, all west-European languages. J. Smuts, B SC (ENGINEERING), FIL, 12 Thorndene Avenue, London N11. LABurnum 7723.

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TECHNICAL TRANSLATIONS. Spanish, French, German. Typescript, camera copy, direct image plates. E. W. Sykes, 39 West Close, Wembley Park, Middlesex. ARNold 4273.

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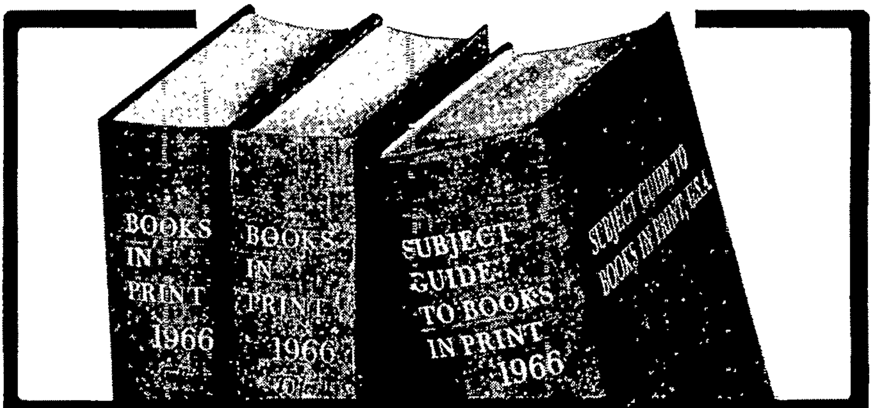
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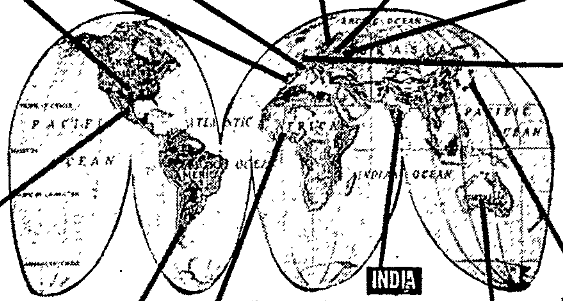

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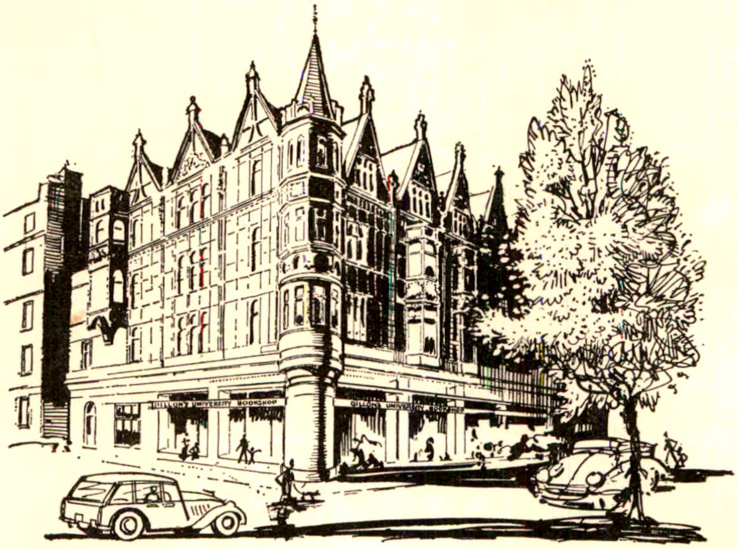

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ASLIB CALENDAR 1966

October

MON.31 – FRI.4.	Course on abstracting and co-ordinate indexing.

November

MON.7.	Course on principles of information system design and planning.
TUE.8.	Course on principles of thesaurus development.
WED.9.	Criminology Group, inaugural meeting, Churchill College, Cambridge, *not* 4th November as previously announced.
WED.23.	Evening meeting at Aslib. 5 for 5.30 p.m. 'Copyright', by G. Woledge.

December

TUE.6 – WED.7.	Course on work with patents. Aslib. See paragraph below.
WED.21.	Members' Christmas Party.

1967

March

FRI.31 – SUN.2.	Aeronautical Group Annual Conference, College of Aeronautics, Cranfield.

April

FRI.14 – SUN.16.	Transport Group Conference at Leicester University.

May

MON.29 – WED.31.	Chemical Group Conference at Attingham, near Shrewsbury.

October

MON.9 – THUR.12.	41st Annual Conference at Harrogate.

Criminology Group Meeting

Owing to unforeseen circumstances, it has been found necessary to hold the inaugural meeting on Wednesday 9th November, instead of Friday 4th November, as previously announced.

Course on Work with Patents

Patents are an important source of technical information, but owing to peculiarities, mainly caused by their status as legal documents, they are not used as much as they should be. In most organizations patent work is dealt with by specialists, but a good understanding of patents is of great value to information officers. Aslib is therefore holding once again its course on work with patents and elementary patent law, on Tuesday and Wednesday, 6th and 7th December 1966.

The lecturer will be Felix Liebesny, B.SC., A.L.A., F.I.Inf.SC., F.I.L., Intelligence Officer, the British Aluminium Company Ltd. The course is intended for those whose work is concerned with the administration and exploitation of patents, and will not deal with detailed aspects of patent law. The fee for the course will be 6½ guineas. The programme is given on a leaflet enclosed with this issue, and applications should be made to the Education Officer, Aslib, on the form supplied with it.

FID/IFIP Conference, 1967

The International Federation for Information Processing (IFIP) and the Fédération International de la Documentation will be holding a joint conference at Rome in June 1967, with the aim of bringing together specialists in the development and operation of mechanized equipment suitable for the storage, retrieval and dissemination of information. The emphasis will be on practical and economically feasible aspects of systems based on experience gained in operation.

Papers are now being invited for the conference. They should conform to the stated themes and report on technical, operational and costing facets of mechanized systems.

Papers should be submitted in English, should not exceed three thousand words, and should not take more than twenty minutes to present.

Chemical Abstracts Service: an experiment in SDI

For one year starting January 1967 CAS will selectively disseminate abstracts from 30 carefully chosen periodicals in the field of chemistry. To participants in the scheme there will be sent every two weeks (*a*) ten copies of the abstracts (*b*) a magnetic tape on which the same abstracts are coded and (*c*) a listing of periodical issues covered. The key-boarding for the tapes is based on a 120-character set having upper- and lower-case, Greek and other special characters, but does not allow structural graphs or lengthy equations. Programmes are available for participants to search the tapes on their own computers. Alternatively the tapes can be searched for clients on a computer at CAS at the cost price of $75 per hour. Since the American Chemical Society is a non-profit organization the estimated costs for participating in the experiment are based on cost only and will depend on the number of participants—for eleven it would be $8,000 each. As part of their aliquot costs participants are expected to pay an instalment of $4,000 before the end of 1966.

Research on the Use of British National Bibliography Services

The Council of the British National Bibliography has made a grant of £1,500 to the School of Library Studies, Queen's University of Belfast, for a two-year study of the uses of BNB booklists and printed cards in United Kingdom libraries. The purpose is to discover (*a*) how far BNB services have become basic instruments of the various activities in which they have a role in different types of libraries; (*b*) the value and reliance placed by librarians on particular characteristics and features of the BNB and (*c*) the precise ways in which particular library operations are organized to make maximum use of the services. The field to be studied includes acquisition work, stock control, classification and cataloguing, and bibliographical and information work in all kinds of libraries.

The study will make use of the results of the recent BNB questionnaire and other existing data, but it is to be based mainly on detailed observations of BNB at work in selected libraries throughout the country. It is intended both to supply a body of consumer research data for use by the British National Bibliography, and to provide the basis for a published manual to promote the best practices by BNB users and subscribers themselves. The research will be based on the Belfast School and carried out by Mr Peter R. Lewis, F.L.A.

Advanced Course in Reference Work

The fourth annual course in advanced reference work to be held under the auspices of the Reference, Special and Information Group of the Library Association will take place in Birmingham from Sunday 2nd to Thursday 13th April 1967.

The course will be residential and will include lectures by visiting speakers, practical sessions in specialized departments of the Birmingham libraries, and visits to industrial and newspaper libraries. It is designed for staff already engaged in reference and information work. The course fee will be £30. Further information may be obtained from the Head of the School of Librarianship, College of Commerce, Gosta Green, Birmingham, 4.

Visit to Nottingham University Computer Research Unit

The Midlands Branch of the Institute of Information Scientists has arranged for a visit to the Research Unit in Chemical Information Dissemination and Retrieval, which has been established by the Chemical Society, with the co-operation of Chemical Abstracts, to investigate the practicability and usefulness of a computer-based information retrieval service for chemists.

The visit will be on Wednesday 16th November, from 2.30 p.m., and an invitation is extended to members of Aslib to attend. Those interested should contact the Secretary of the Midlands Branch of the Institute of Information

Scientists, Mr B. T. Stern, at BIP Chemicals Ltd, Popes Lane, Oldbury, Birmingham (Telephone: Broadwell 1551) *before the end of October.*

Directory of Northern Library Resources

The third edition of the *Directory of Northern library resources*, published in August, contains details of 110 libraries—over twenty more than the last edition. The *Directory* is thirty pages long, including six pages of subject index and is printed by offset photo-lithography. It can be obtained, price 10*s* 0*d*, including two BNB cards, from The Northern Circle of College Librarians, Northumberland County Technical College, Hawthorn Road, Ashington, Northumberland.

OSTI Newsletter

The first number of the quarterly *OSTI Newsletter*, dated September 1966, has just appeared. Published by the Office for Scientific and Technical Information, the *OSTI Newsletter* will carry notes on new grants and contracts and progress with existing ones, new policy developments, and new activities with which OSTI is associated. Although the main intention is to provide current information, an attempt will be made to build up a comprehensive record of OSTI's activities.

OSTI does not want the *Newsletter* to develop into yet another serial publication, and is therefore restricting the mailing list to genuinely interested users and journal editors. Inquiries should be made to The Newsletter Editor, OSTI, Room 1116, State House, High Holborn, London, WC1.

A New Chairman for the Advisory Committee for Scientific and Technical Information

The Secretary of State for Education and Science has appointed Dr F. S. Dainton, FRS, Vice-Chancellor of Nottingham University, as Chairman of his Advisory Committee for Scientific and Technical Information in succession to Sir James Cook, FRS, at present Vice-Chancellor of Exeter University and Vice-Chancellor designate of the University of East Africa.

Chicago Library School Scholarships

The University of Chicago Graduate Library School will offer approximately thirty scholarships and fellowships for 1967–8, in amounts up to $6,700. Included are six predoctoral and two postdoctoral training stipends ($2,400 and $6,500, respectively, tuition-free) for medical librarianship. Application deadline for scholarships and fellowships is 15th January 1967. A number of research assistantships will also be offered; these are on a half-time (20 hours per week) basis and are compensated at an hourly rate depending on the qualifications of the student. Applications for the latter will be considered at all times during the year. Address inquiries to: Dean, Graduate Library School, University of Chicago, 1116 East 59th Street, Chicago, Illinois 60637.

FID in Tokyo

The 33rd conference of the International Federation for Documentation (FID) and the International Congress on Documentation will be held in Tokyo from 12th to 22nd September 1967. The symposia at the International Congress will consist of thirty-five to forty-five lectures and papers on the following main topics: documentation for users; education of scientists in documentation and the training of professional documentalists; current trends in documentation. Contributions should preferably be in English.

Those wishing to attend or submit papers should contact the Secretariat immediately. The address is: 1967 FID Congress Secretariat, Science Council of Japan, Ueno Park, Taito-ku, Tokyo, Japan. The fee is $10 US.

Evening Meeting, November

The evening meeting at Aslib on Wednesday 23rd November will be concerned with copyright. The speaker will be Mr G. Woledge. In an earlier paper published in the *Journal of Documentation* (vol. 14, pp. 45–55) Mr Woledge discussed the situation of copyright and libraries in this country, approaching it from general principles. On the present occasion he will consider the kinds of case which arise most frequently in library work, indicating the appropriate procedure in each of them in the light of the relevant parts of the law.

CONSTRUCTION AND USAGE OF CLASSIFIED SCHEDULES AND GENERIC FEATURES IN CO-ORDINATE INDEXING

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Co-ordinate Indexing Group Meeting, Thursday 28th July 1966

THE purpose of this article is to examine the hypothesis that classified schedules of features, with specific/generic relationships, are of value in feature-card indexing.' The data in support of the hypothesis has been drawn from experience gained in the construction and use of a feature-card index designed for anaesthetics literature. This index has already been described in detail elsewhere;[1, 2, 3] but to make this article comprehensible it is necessary after outlining the problem of the information explosion in medicine, and in anaesthesia in particular, to give a brief account of the development and structure of this feature-card index.

The information explosion

The first medical journal,[4] *Nouvelles Découvertes sur Toutes les Parties de la Médecine* appeared in the seventeenth century. Today, estimates of the number range from 5,500[5] to 9,000[6] a year with an increase of two each week.[7] The *Index Medicus* of the National Library of Medicine and the MEDLARS computer system cover over two thousand medical journals and by 1969 the figure will have increased to three thousand.[8] The first anaesthetics journal, *Current Researches in Anesthesia and Analgesia,* was published in 1922 and there are now about forty journals devoted solely to anaesthesia.[9] Articles of interest to the anaesthetist are also published in the more general medical journals such as the *British Medical Journal* and *Lancet,* and in certain specialized journals of other branches of medicine like the *Journal of Applied Physiology* and *Medical Electronics and Biological Engineering.* Thus the information explosion in medicine may not be as devastating as that in science or technology, but it is certainly formidable—a fair comparison might be between the Hiroshima atomic bomb and a modern thermo-nuclear device. In the particular speciality of anaesthesia there are over two thousand articles published each year to which the ideally informed anaesthetist should have ready access, though whether any such 'ideally informed' individuals exist in any discipline is open to considerable doubt.

Development of the index

The journal *Anaesthesia* publishes with each quarterly issue a list of articles appearing in other anaesthetics and more general medical and specialized journals. All the different words that occurred in 500 titles over a period of one year were written down in alphabetical order. The words were then classified into several broad groups, such as physical terms, drugs, diseases; and at the same time irrelevant words were eliminated (e.g. 'the' and 'those'), synonyms combined (e.g. 'tension' with 'pressure') and antonyms inserted (e.g. 'temporary' against 'permanent'). This crude classification formed the original thesaurus, but it proved unsatisfactory when an attempt was made to allocate features in a trial of fifty articles. The main reasons for this failure were that the feature words had been selected in isolation, without paying attention to the concepts expressed by the words, and that medical terminology in itself is frequently imprecise and even inaccurate. It is believed[10] that 'between one-quarter and one-half of medical and paramedical terminology, depending on the speciality, consists of obsolete, rare, officially rejected, or otherwise undesirable synonyms.'

The thesaurus was therefore reorganized bearing in mind the following criteria:

What concept is expressed by a word or a phrase?
Which concepts need to be included in the index?
How may questions be asked of the index?

During this reorganization it became apparent that if generalized questions as well as detailed ones were to be answered, without greatly increasing the work of the potential searcher, it would be necessary to have generic in addition to specific features. This modified thesaurus retained the form of classified

FIGURE I

An extract of 'Anaesthetic literature' taken from the journal *Anaesthesia*. Note the features in capital letters following each reference, with drugs in small letters for trigraph permutations.

Clinical studies of induction agents. XIII: Liver function after propanidid and thiopentone anaesthesia. CLARKE, R. S. J. *et al.* (1965). *Brit. J. Anaesth.*, *37*, 415. (June) (LFT'S were normal following short procedures, but abnormal after longer procedures) ABNORMAL ALIMENTARY–SYSTEM+7 ANÆSTHESIA BARBITURATES CHRONIC DRUGS NON–BARBITURATES NON–INHALATIONAL PHYSIOLOGY thiopentone, propanidid

Induction of anæsthesia with methohexitone and thiopentone in E.C.T. The effect on the E.C.G. and clinical studies in 500 consecutive treatments with each agent. PITTS, F. N., DESMARAIS, G. M. *et al.* (1965). *New Engl. J. med.*, *273*, 353. (12 Aug.) (Atrial arrythmias were 3 times commoner and ventriclar arrythmias 4 times so with thiopentone. The thiopentone ventricular ectopics were multifocal in 40% of instances) ABNORMAL ANÆSTHESIA ARRHYTHMIA BARBITURATES CARDIOVASCULAR–SYSTEM DRUGS E.C.T. NERVOUS–SYSTEMS NON–INHALATIONAL TREATMENT methohexitone, thiopentone

Thiopental metabolism by human liver in vivo and vitro. MARK, L. C., BRAND, L. *et al.* (1965). *Nature*, *206*, 1117. (12 June) (metabolism is by microsomal enzymes in the liver) ALIMENTARY–SYSTEM+7 ANÆSTHESIA BARBITURATES DRUGS METABOLISM NON–INHALATIONAL thiopentone schedules of features and incorporated specific/generic relationships, but was based on concepts rather than words. With it features were allocated in a second trial of a hundred articles with very little difficulty.

Finally the features were checked against MESH[11] (the Medical Subject Headings used to programme MEDLARS) to ensure that there were no glaring omissions, and a simple alphabetical list was compiled of all the features. In this alphabetical list were combinations of feature words, known as 'conventions', that are used to express certain concepts that cannot be conveniently covered by single features. The list of articles in each quarterly issue of the journal *Anaesthesia* is now published with the features allocated to each article. All that a user has to do to make his own feature-card index is to give a serial number to each article and to punch the holes in the feature cards. There are two points concerning the logistics of this worldwide system: firstly, serial numbers are not allocated to each article in advance, so that an individual is free to omit articles of little interest and to insert others, not in the list, that are of particular interest to him, without any wastage of numbers in the feature cards; secondly, diseases, drugs and substances for which trigraph permutations are used for coding are shown as small letters, whereas feature words are in capital letters (figure 1). This invites individuals to choose a trigraph permutation or a separate feature card for any given disease, drug or substance. The reason for allowing such degrees of freedom is to make the system acceptable to many individuals with widely differing interests. This is the first time that a clinical medical journal has attempted to tackle the information explosion with feature-card indexing.

It is, of course, difficult to judge the success of the thesaurus of a feature-card index, but one possible approach (Snel, R. (1964) personal communication) is to note how the thesaurus increases in size as the number of articles in the index increases. The more comprehensive the thesaurus, the sooner will a ceiling be attained, though a small, constant increase is bound to occur as progress brings new concepts into being. Figure 2 shows the increase in the numbers of features and conventions used in this index as the number of articles increased. It can be seen that a ceiling was rapidly attained and that, if anything, the thesaurus contains some features that are unlikely to be used frequently.

Structure of the thesaurus

Figure 3 illustrates the principle of the classified structure and the specific/generic relationship of the thesaurus. The following points should be noted:

a Only words in capital letters are features, e.g. PATIENT, OUT-PATIENT, VOLUNTEER, etc.

b Words in small letters are either headings of schedules which are not in themselves features, e.g. 'Subject of study and attributes', or explanatory notes, e.g. '(assume supine unless specified otherwise)'.

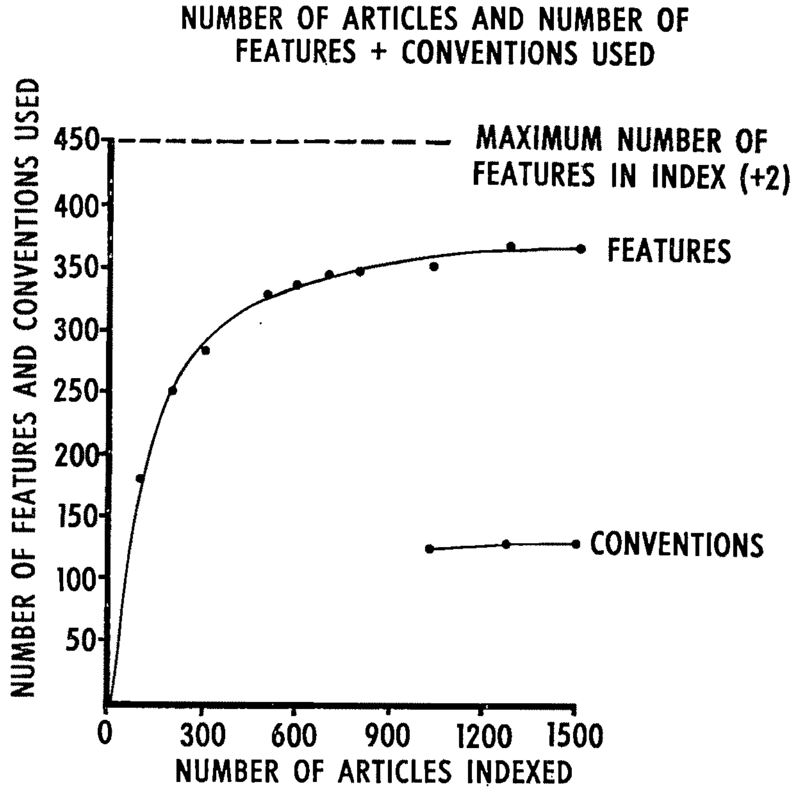
c Alternative words separated by oblique strokes are either different grammatical constructions, e.g. *MOTHER*/MATERNAL, or concepts which, for the purpose of this index, are so similar as not to require separate features, e.g. RESPIRATION-UNIT/*INTENSIVE-THERAPY-UNIT*. The secondary feature word is printed in italic capitals.

d Gaps between groups of feature words are a simple form of further classification which makes for better visual presentation but is of no further significance.

e Specific features are shown indented to their generic feature, e.g. NEONATAL, PAEDIATRIC and GERIATRIC are indented to AGE.

Figure 4 is a list of all the classified schedules in the thesaurus, the rows of dots indicate sub-schedules, e.g. in 'Anatomical sites' there are schedules for the cardiovascular system, respiratory system, alimentary system, etc.

FIGURE 2



The hypothesis

The way in which a classified thesaurus with specific/generic relationships between features is of value in feature-card indexing can be examined in several different ways. However, the most logical approach is to consider the advantages, firstly to the indexer and secondly to the searcher. Disadvantages have also to be considered, and finally the place of the simple alphabetical list has to be taken into account.

FIGURE 3

Three classified schedules (modified) from the thesaurus.

Subject of study and attributes

- PATIENT
- OUT-PATIENT
- VOLUNTEER
- *MOTHER*/MATERNAL
- FOETUS
- ANIMAL

- SURGEON
- ANAESTHETIST
- NURSE

- UNDERGRADUATE
- POSTGRADUATE

- AGE
  - NEONATAL
  - PAEDIATRIC
  - GERIATRIC
- SEX
  - MALE
  - FEMALE

Place

- DOMICILIARY
- *IN-TRANSPORT*/TRANSPORTING
- WARD
- ANAESTHETIC-ROOM
- OPERATING-THEATRE
- RECOVERY-ROOM
- RESPIRATION-UNIT/*INTENSIVE THERAPY-UNIT*

- LABORATORY
- STORE/*BANK*

- *POSTURE* (*assume supine unless specified otherwise*)
  - PRONE
  - LATERAL
  - HEAD-DOWN
  - HEAD-UP
  - SITTING

  - LITHOTOMY
  - OTHER-POSITION

FIGURE 4

List of classified schedules

- Type of document
- Subject of study and attributes
- Place
- POSTURE
- Anatomical sites
- . . . .
- Indications of direction
- Indications of degree
- Indications of time
- Indications of number
- Indications of change of size or shape
- Classical subjects
- Mathematical terms

- Physical and chemical terms
- Pharmacological terms

- Substances: general
- Form of substance
- DRUGS
- . . . .
- Functional properties (physiology)
- . . . .
- Deviations from normal (pathology)
- . . . .
- Procedures: general
- Procedures for determining state
- Procedures for changing or maintaining state (treatment)
- . . . .
- Types of procedure or modes of operation
- APPARATUS
- . . . .

Advantages to the indexer

The production of a relatively comprehensive thesaurus at the very beginning is desirable and the arrangement of features in a classified order help in this by:

a Drawing attention to obvious omissions because, instead of considering words in isolation, there is a natural tendency to think of the concept expressed by the words;
b Bringing synonyms and near synonyms together;
c Demanding definition of loose terminology on which attention is focused.

When the indexer, or group of indexers, begins to allocate features to a series of articles the advantages are:

a When the need for a new feature is thought to arise, it is a simple matter to decide if a suitable feature is already in the thesaurus. A recent example of this type of problem occurred with the word 'cleaning', for which there was no obvious feature available; however, 'cleaning' is a procedure, and inspection of the 'Procedures: general' schedule showed that there was an acceptable alternative—'STERILIZATION'. Sterilization is a special form of cleaning and has been adopted as the feature because of its frequent use in medicine compared with the more general term 'cleaning'.
b The specific/generic relationship of features is immediately shown without using any complex system of cross references. This reminds the indexer to use the generic features, especially if there is more than one degree of 'genericity'.
c When a single feature may be specific to more than one generic term the relationship can be shown without ambiguity by repeating the specific feature under different generic features in different schedules.
d The physical format of the thesaurus is interesting and attractive to the eye.

All these advantages of a classified thesaurus with specific/generic relationships lead to one primary objective, namely that the allocation of features to articles shall be a simple and consistent activity on the part of the indexer. It is easy to imagine the chaos which would be found by a searcher of an index in which similar articles had been given different features.

Advantages to the searcher

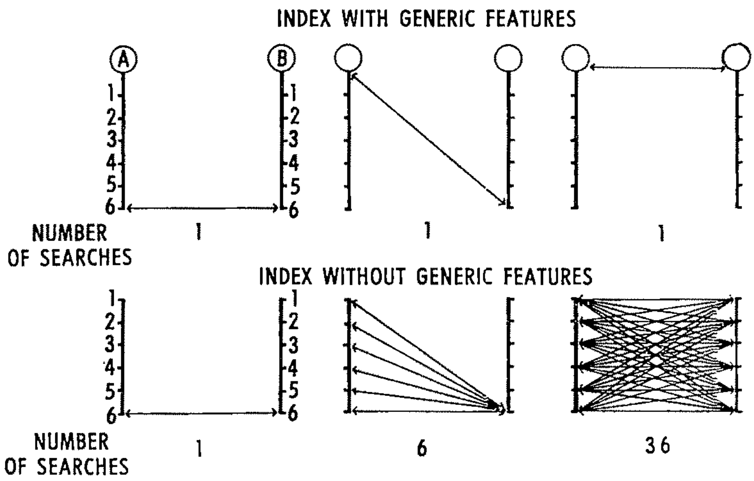
From the searchers' point of view the advantages depend on the type of question asked and the language in which the question is phrased.

The question put to an index may be a general one or a highly specialized one. At first sight it may seem that the important fact here is merely the depth of indexing. If the depth is sufficient then certainly the information can be retrieved in response to the highly specialized inquiry; but if the question is of a general nature, covering several specific features, then the index will have to be searched several times to ensure complete retrieval, unless the index has the relevant generic features.

If this topic of specific/generic relationships is analysed a little further, the advantages of generic features can be strikingly demonstrated. Consider an inquiry concerning two distinct facets: it may involve specific features of both facets, a specific feature of one facet and a generic feature of the other, or generic

FIGURE 5

GENERIC/SPECIFIC RELATIONSHIP - QUESTION WITH TWO FACETS

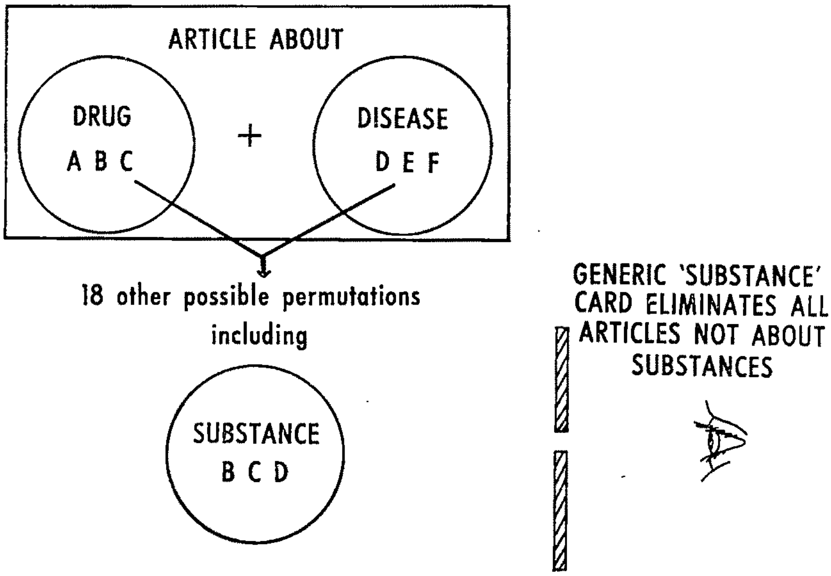


features of both facets. Figure 5 shows the number of searches required for complete retrieval in two hypothetical feature-card indexes in response to these three types of inquiries. In the one index there are the generic features 'A' and 'B', each with six specific features, while in the other there are only the six specific features for each facet. In the first index all three types of inquiry can be answered by single searches, but in the second the number of searches are one, six, and thirty-six respectively. In certain technical fields, generalized questions may not be asked (possibly no self-respecting metallurgist would ask his information officer about 'heat treatment of metals'), and, if this is the case, there would probably be no value in having generic features. In anaesthesia, however, inquiries of a generalized nature are frequently made.

The searcher may phrase an inquiry not exactly in the terminology of the particular index. A classified thesaurus is of value in this situation, as it shows with minimum effort to the searcher the most suitable feature available. Suppose that a question is asked about anaesthesia for the monkey, and that 'monkey' is not a feature simply due to the limited depth of indexing. Then it would not be unreasonable to expect a user to look at the 'Subject of study and attributes' schedule (figure 3). From this it would be obvious that the preferred feature is 'ANIMAL'. Without classification the searcher might feel obliged to look through the alphabetical list for such features as 'anthrapoid ape', 'chimpanzee', 'gorilla', 'mammal', 'primate', etc. Though theoretically possible to construct a long alphabetical list, covering all variations of potential searchers' expressions, it would become so lengthy as to be quite unmanageable.

In the specialized case of trigraph permutations, a generic feature (see figure 6) reduces the incidence of false optical coincidence.

FIGURE 6
The particular drug is coded by punching the serial number in feature-cards 'A', 'B' and 'C', and the disease by punching cards 'D', 'E' and 'F'. Hence any combination of three of these six letters would reveal optical coincidence at the serial number. Thus a searcher looking for the substance coded by 'B', 'C' and 'D' would be falsely referred to the article about drug 'A', 'B' and 'C' and disease 'D', 'E' and 'F'. However, this can be prevented by use of a generic 'substance' card.


ARTICLE ABOUT
DRUG
A B C
+
DISEASE
D E F
18 other possible permutations including
SUBSTANCE
B C D
GENERIC 'SUBSTANCE' CARD ELIMINATES ALL ARTICLES NOT ABOUT SUBSTANCES

Disadvantages

If the initial compilation of a thesaurus has been alphabetical, the only disadvantage of adding classified schedules is the labour involved.

The use of generic features in addition to specific has some minor disadvantages:

a A greater number of features are allocated per article, thus increasing the work of the indexer;

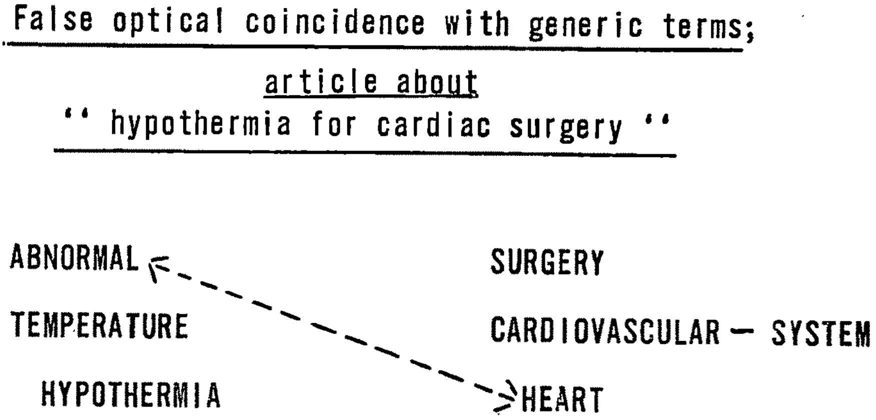
b Some of the features may become over-used and hence can be less selective in retrieval;

c Although, as mentioned previously, generic features can reduce false optical coincidence in relation to trigraphs, they may generate additional false coincidences in circumstances such as those shown in figure 7.

The place of the alphabetical list

Despite the merits of a classified thesaurus, the simple alphabetical list is an almost indispensable part of any feature-card index; the searcher usually finds it more convenient for the majority of his inquiries, and it also shows, in the simplest manner, how groups of feature words can be combined to form a convention. If all the conventions were incorporated into classified schedules

FIGURE 7
Note: the dotted arrow indicates the possibility of a false optical coincidence.


False optical coincidence with generic terms;
article about
'' hypothermia for cardiac surgery ''
ABNORMAL
TEMPERATURE
HYPOTHERMIA
SURGERY
CARDIOVASCULAR – SYSTEM
HEART

they would become too complicated for visual presentation. For example, the convention used in this index for 'A—a difference' (six feature words: ALVEOLUS + ARTERY + BLOOD + CONCENTRATION + GAS-EXCHANGE + PRESSURE) could not fit neatly into classified schedules.

Summary

The hypothesis that 'a classified thesaurus with specific/generic relationships is of value in feature-card indexing' has been examined and in the authors' opinion found to be valid. The advantages of such a thesaurus are that it helps the indexer to make the thesaurus comprehensive initially, to regulate its development efficiently, and to be consistent in the allocation of features; in addition it helps the searcher to see what features are available and reduces the number of searches required to answer more generalized questions. The only disadvantage is the extra work for the indexer. As any retrieval system of information is made for the searchers' benefit, and not the producer's convenience, the disadvantages are subordinate to the advantages.

Acknowledgments

We would like to thank Mr W. Ashworth and Mr Sharpe of ICI Fibres Limited, Mr R. Snel of the Shell International Petroleum Company, and Riker Laboratories Limited for much valuable help and advice in the construction of the thesaurus and on the principles of feature-card indexing; Professor W. W. Mushin of the Department of Anaesthetics of the Welsh National School of Medicine for his encouragement, enthusiasm and criticism during the development of the Cardiff Feature Card Index; and the Editorial Board of *Anaesthesia* for launching the index into clinical medicine, and permission to reproduce figure 1.

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DISCUSSION

Dr W. E. Batten said that Dr McClelland had given abundant evidence of the strange ways in which familiar words do service for unfamiliar concepts. This seemed to him to reinforce the belief that anything approaching a 'universal' thesaurus is a pipe-dream. Universality is not likely to extend beyond specialist groups.

Mr G. M. Boyd (Lloyds Technical Register) congratulated the speaker on the clarity, conciseness and completeness of his exposition. Like him, he had started about ten years ago without the knowledge or qualifications of an indexer or a librarian. By applying methods similar to Dr McClelland he had produced a co-ordinate indexing system which is operating very well and now comprises some thirty-five thousand items. The speaker had well substantiated the principle that co-ordinate indexes are best when tailored to the job for which they were intended; also the important principle that concepts should be used rather than words, thus avoiding involvement in problems of semantics. In the matter of the classification of features, the objective is just to find the features and then to find the items. Therefore some system of classifying features is expedient and natural; the 'generic/specific' concept is helpful if not pressed too far and Dr McClelland has very prudently kept it simple.

Mr R. A. Fairthorne (Herner & Co) said that 'co-ordinate indexing' originally implied only overlap of features or characteristics. This was because originally it was applied to topics in which no agreed structure of discourse had evolved. Nowadays we are introducing some structure also, largely as very short generic/specific chains (not a few 'trees', but many 'saplings'). This is an interesting problem that has been studied for some time (e.g. Calvin Mooers from 1949–57), but one that still demands fuller analysis.

Dr W. E. Batten (ICI Ltd) said that it was not easy to decide, for a particular system, whether the generic term should be inclusive of its species, or whether it should be reserved for items which treat of the generic *at the generic level.* Whichever usage is adopted, the convention must clearly be stated, and adhered to. If the generic is used inclusively, the 'automatic posting-on' is probably better practice than asking the indexer to remember when indexing.

Dr McClelland said that he and his colleague Dr Mapleson had initially spent a great deal of time arguing about which generic features should be allocated to any particular article; however, it soon became apparent that it was more economical in time to allocate all the generic features as a routine in spite of the chance of creating crossovers.

Mr K. P. Jones (Natural Rubber Producers' Research Association) asked the speaker how many drugs were in his supplementary trigraph index.

Dr McClelland answered that there were at present 200 but that the number was growing.

Mr C. S. Sabel (Central Electricity Generating Board) asked the speaker how he had derived the classification in his thesaurus and whether as a result of his work he would agree that it is a necessary condition that the compiler of a subject classification must have a deep knowledge of the subject.

Dr McClelland replied that the classification had been derived largely by considering what type of question was likely to be put to the index, and obviously for this a detailed knowledge of the subject field is essential.

Dr W. E. Batten (ICI Ltd) commented that the speaker's approach had been wholly pragmatic with only the anaesthetist in mind. This was practical.

Dr G. Glaser (Morganite Research and Development Ltd) had three questions for the speaker. Firstly, had he considered consulting the Medlars list of terms and/or a ready-made hierarchical classification (such as the medicine section of the UDC) before starting to construct his schedules? Secondly, had he considered the use of roles? Thirdly, who does the indexing in Cardiff?

Dr McClelland said that they had looked at the UDC and found it unhelpful and admitted that when they started they had not thought of using Medlars. He did not understand what was meant by the term 'roles'. To the third question he said he did the indexing himself.

Mrs Lea Bohnert (C–E–I–R Inc) pointed out that the speaker had probably overcome the need for roles with the generic structure that he had devised.

Mr G. M. Boyd (Lloyds Technical Register) said it was fortunate that the speaker hadn't heard of roles, because if he had he would probably have become bogged down in problems of syntax and semantics.

Mr J. C. Jewell (Castrol Research Laboratory) asked the speaker how many features were in his index and how many documents were in the system.

Dr McClelland replied that there were 450 features and over two thousand documents.

Mr G. M. Boyd (Lloyds Technical Register) said he was intrigued that the speaker had, like many others, arrived at a figure of 450 features, even in his complex field. There seemed to be some magic about this figure. It may be related to the fact that the number of combinations that can be made with n different things is $2^n - 1$, which with $n = 450$ is an astronomical figure. It may also be relevant that attempts to reduce the English language to its basic minimum vocabulary have also led to about five hundred words.

Mr R. A. Fairthorne (Herner & Co) said he was not enamoured of attempts to create more or less 'universal' sets of basic (atomic) notions. Too many people had got swallowed in the attempt, from Wilkins and Leibniz on. In his opinion language has purely local habits of discourse, each applicable to some parochial and contemporary activity. He illustrated that problem by reference to 'paleo coordinate indexing', of Mooers (1949). Ideally, exactly n features out of 2n were used to discriminate between $\binom{2n}{n}$ items (where $\binom{2n}{n}$ = number of combinations from 2n distinct items taken n at a time $\simeq \frac{2^n}{\sqrt{\Pi n}}$). The other n were asserted as absent. Each feature applied to half the items, and each item involved half the features. This is the most structureless form of description possible. No specification (request) is a Boolean function of another. However, it cannot be achieved with actual semantic features (descriptors). Mooers achieved it by ingenious coding so that the internal system was of this ideal form, while the language of invocation was in terms of the particular users. Introduction of structure into the *internal* system will upset this ideal situation.

Mr C. S. Sabel (Central Electricity Generating Board) asked the speaker if he believed that he should seek identical terms wherever possible to those used in related fields or did he see each subject field developing separately? For example, it is likely that a similar exercise in histology would lead to some common terms: would he regard this as a relationship that should be developed? Put generally, did Dr McClelland see the future as a building up and linking together of small subject divisions (like his own) into larger subject classifications or did he see fragmentation as the better solution?

Dr McClelland replied that he believed each subject field of medicine would develop separately though some features would definitely be common to the different specialities. He saw his own system as a fragmented one—a feature card index for the individual anaesthetist's 'desk-top'.

Mr C. S. Sabel (Central Electricity Generating Board) asked whether the speaker had any views on the optimum number of terms to be used in a subject field. Additionally, whether he could give any guidance for a method by which it would be possible to be sure, before one seeks to subject classify a field, that one is not led into an impossible position regarding the number of terms that arise. Or, put another way, is more than one thesaurus needed for a large system.

Dr McClelland said he certainly found 450 features quite a manageable number. With a vast subject field a thesaurus could become too large if the index was of considerable depth.

Dr W. E. Batten (ICI Ltd) stated that one should not assume that growth in size is synonymous with growth in complexity.

Dr McClelland suggested that a balance could be established. The larger the subject field the shallower the indexing.

Mr D. M. H. Dewar (Morganite Research and Development Ltd) said that the use of trigraphs need not be limited to three out of twenty-six; it could be three out of ten or fifty. If several trigraph terms occur in the same document false drops can be troublesome especially if most of the possible codes are used. False drops can be reduced by using a separate alphabet for each class of term (e.g. drugs, diseases) for which trigraphs are used. Thus drug *abc* + disease *def* will not give drug *abe* as when only a single alphabet is used. Regarding the automatic punching of generic terms as well as specific, this must depend on the 'average question' asked of the system. If this is 'please give me everything on ceramics, including items covering only one or two particular ceramics', it would clearly be better to punch 'ceramic' whenever a ceramic material is punched. If questions tend to be either 'give me everything on ceramics in general' or 'give me everything on (say) two specified ceramics' it would be better not to punch the generic term automatically or else the first question will get too many answers.

Dr McClelland said that confusion was often introduced by the imperfectly phrased question, usually by its own lack of specificity. He agreed that trigraphs could cause false drops but said he used two methods for reducing this factor. The first was that the commonest drugs had their own individual feature cards, and the second was the use of a generic card together with the three trigraph feature cards.

Mr J. L. Jolley (J. L. Jolley & Partners Ltd) said that the use of trigraphs (or any other polygraphs) was dangerous if more than one such was used, from the same alphabet, in respect of the same item. However, some palliative action could be taken. To start with, one should know when one has created this dangerous situation, so that one can prepare (and punch) a card titled 'warning' if one wishes. If this is kept in the stack during retrieval one can see the items which may yield a 'crossover' (a false drop). Other methods of coping with this situation include using an alphabet so large that the chance of any false polygraph actually having a meaning is very small; indexing polygraphs (which together would cause a crossover) in separate positions (using two items for the purpose); and reallocating the meanings of polygraphs known from experience to cause difficulty. The calculation of an expected number of crossovers or false drops can be undertaken but is tricky; one has to make many assumptions, including

a how many letters are in the polygraphs
b how many polygraphs (on average) are laid against one item
c how many common letters any set of polygraphs may be expected to have.

On the whole, if polygraphs have to be used when the features they represent are not mutually exclusive, most people learn the tricks of their own system by experience.

Mr K. P. Jones (Natural Rubber Producers' Research Association) pointed out that Mr Dewar could get over his generic/specific problem by allotting two generic cards, e.g. ceramics (generic), ceramics (general references) and specific ceramics.

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ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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ASLIB PROCEEDINGS

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Volume 18 November 1966 Number 11

ASLIB CALENDAR 1966

November

WED.23.	Evening meeting at Aslib. 5 for 5.30 p.m. 'Copyright', by G. Woledge.
FRI.25.	Technical Translation Group. 5 p.m. Discussion panel; 6.30 p.m. Sherry Party. At Aslib.
WED.30.	Aslib evening meeting. 5 for 5.30 p.m. 'Aslib, past and future', by Professor R. S. Hutton.

December

TUE.6–WED.7.	Course on work with patents. Aslib.
WED.14–THU.15.	Biology Group joint conference at British Museum (Natural History). See paragraph below.
WED.21.	Members' Christmas Party.

1967

January

THU.5.	Technical Translation Group. 3.30 p.m. Annual general meeting; 5 p.m. 'Translating a Chinese grammar from Russian into English', by R. Hardbottle. At Aslib.

February

WED.1.	Engineering Group Conference. 10.30 a.m. Aslib.

March

FRI.31 – SUN.2.	Aeronautical Group Annual Conference, College of Aeronautics, Cranfield. See paragraph below.

April

FRI.14–SUN.16.	Transport and Economics Groups Conference at Leicester University.

May

MON.15 – WED.17.	Chemical Group Conference at Attingham, near Shrewsbury.

October

MON.9 – THUR.12.	41st Annual Conference at Harrogate.

Professor R. S. Hutton

Professor R. S. Hutton, a founder-member of Aslib and one to whose guidance in its early years it owes much of its success, celebrates his ninetieth birthday on 28th November 1966. In offering warmest congratulations and best wishes to him on this occasion, we recall with gratitude his many services to Aslib from its foundation in 1924 and the planning of its first conference. He served as Chairman of the Council from 1930 to 1935, as President from 1942 to 1944, accepted Honorary Membership in 1955, and, as many members will recall, he was one of the principal speakers at its fortieth anniversary celebration in the King's Library of the British Museum in November 1964.

Those who read with interest and enjoyment his *Recollections of a technologist*, published in 1964 (Pitman), will be pleased to know that Professor Hutton has just had privately printed as a supplement, *Selected reprints and notes on work carried out by the author and some of his co-workers.*

To mark the occasion of his ninetieth birthday, Professor Hutton has kindly agreed to talk about the early experiences of Aslib and also to give his views on the future development of library and information services at an evening meeting at 3 Belgrave Square, on Wednesday, 30th November. This will take the form of an interview in which Professor Hutton will be 'Frankly Speaking' and the questions will be put to him by a panel consisting of Miss M. Gosset, Mr B. Fullman and Mr Leslie Wilson.

Aeronautical Group

The 16th Annual Conference will be held at the College of Aeronautics from the evening of Friday 31st March to teatime on Sunday 2nd April. The programme is not yet complete, but papers will be given on 'Microfilm for retrieval systems' by B. J. S. Williams of HERTIS, 'Handling periodicals in a large research and development establishment' by Mr Pottage of ASWE, and 'The achievements of the Cranfield Project' by Mr C. W. Cleverdon. The technical paper will be on 'All weather operation of aircraft' and will be presented by a member of the staff of the Blind Landing Experimental Unit, RAE Bedford. Programmes will be sent to all members of the Group. Anyone else who is interested should contact Mr E. J. MacAdam, 74 Stancliffe Road, Bedford.

Annual Conference of FID

The FID's annual conference was held in The Hague during the week preceding the Aslib conference. It consisted mainly of business meetings of the General Assembly and Council, but each study committee (e.g. on classification research, technical information for industry, training, theoretical bases of information) held a programme session, open to all participants and intended to facilitate an exchange of ideas on the future work of these committees. Although in this sense it was a closed conference (i.e. there was no open congress for the discussion of specialist papers), it was attended by some 350 people from forty countries and a number of international organizations, including forty-five from the UK.

The business of the General Assembly, where Aslib was represented by Mr J. R. Stocks, was on this occasion largely of a formal nature—the ratification of new statutes, review of committee organization, election of officers, etc. The Director of Aslib was re-elected Treasurer of the Federation and a member of the General Assembly and Council, as well as of the four-man Executive Committee. The Executive Committee is a new committee responsible for supervising the work of the secretariat in between Council meetings; the other members are the President, Mr K. Lowry, USA, and the two Vice-Presidents, Professor H. Arntz, Germany, and Dr P. Lazar, Hungary. One important step taken by the General Assembly was to ratify the appointment as Secretary-General of Mr F. Sviridov, formerly on the staff of VINITI, Moscow.

The Council of FID will next meet in The Hague on the 9th and 10th February 1967, in an extraordinary session which will not include programme sessions.

Statement on Technical College Libraries

The Association of Teachers in Technical Institutions has issued a policy statement on *The use of libraries*. This report represents the views of college lecturers and librarians, and stresses the use which should be made of college libraries, rather than the resources to be made available. There are sections on stock, accommodation, library committees, and finance. Special stress is laid on teaching the use of libraries and literature, and this section is illustrated with sample curricula. There is also a section on service to industry and other educational establishments, and a consideration of the staff needed to carry out these services. The statement has an extensive bibliography. It is obtainable from the Association of Teachers in Technical Institutions, Hamilton House, Mabledon Place, London WC1. This statement should help to improve library services in technical colleges.

New premises for BNB

The British National Bibliography has just acquired new premises at 7 and 9 Rathbone Street, W1, slightly west of its previous address in Bedford Square. Since the building is at present finished to industrial rather than office standards, BNB expects to have to wait until mid-1967 before moving in.

Communication in Biology

A conference on Communication in the Biological Sciences will be held in the British Museum (Natural History) by the Biological Group and the Institute of Biology on Wednesday 14th and Thursday 15th December 1966. Details of the programme will be circulated to members of the Group towards the end of October. Any others who would like to attend this conference should write to Miss P I. Edwards, Department of Botany, British Museum (Nat. Hist.), Cromwell Road, London SW7.

IFIP Congress

The 1968 IFIP Congress will be held at Edinburgh from the 5th to 10th August. This will be a world congress, such as IFIP holds every three years in a member country, and over four thousand computer experts are expected to attend. The subjects to be discussed in some 250 technical papers will be divided broadly into mathematics, computer languages, computer equipment, scientific applications, education and business. The proceedings will be published after the conference. There will also be an exhibition of computers, computing equipment and allied services at Edinburgh's Waverley Market. Further information on the programme, accommodation, etc., will be announced in due course.

Winston Churchill Memorial Trust

Winston Churchill Travelling Fellowships are available during 1967 to staffs of museums, art galleries and libraries. Awards, which cover the return air fare at economy rates, an allowance for daily living, and certain other expenses by arrangement, are normally available over three to twelve months. Applicants should be prepared to show how experience thus gained abroad would be fruitful in their own community. Completed application forms should reach the office of the Trust, 7 Charles Street, London W1 (Mayfair 0091/2) not later than 30th November.

Trade associations and professional bodies of the United Kingdom, compiled by Patricia Millard, 3rd ed., Pergamon Press, 1966. Price 60s.

The third revised and enlarged edition of this directory is now published. The arrangement is the same as in the second edition.

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VINITI Journals

From January 1967 the monthly *Naučno-tehničeskaja informacija* will appear in two independent series: 1. *Organizacija i metodika informacionnoj raboty* and 2. *Informacionnoje processy i systemy*. The annual subscription for each will be R3. (See *Naučno-tehničeskaja informacija*, no 7, 1966.)

The Faraday Press, Inc., New York, has announced that from 1967 it will publish the new quarterly *Automatic Documentation and Mathematical Linguistics* (annual subscription $145). This will contain translations of selected articles from *Naučno-tehniceskaja informacija.*

The International Relations and Information Department of VINITI will begin publishing this year *Naučnaja i tehničeskaja informacija za rubezom* (Scientific and technical information abroad). This will contain surveys, based on literature analysis, of science information activities in other countries and of international organizations in this field. The first issue, scheduled to appear this autumn, will cover the organization of science information in the German Democratic Republic and in the Netherlands, and the activities of the CNRS in France.

European Press Guide

The first edition of *Willing's European press guide*, long in the 'forthcoming' state, has now appeared. It contains an interesting collection of newspaper and journal titles published in Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Portugal, Sweden, Switzerland. These are listed under subjects, subdivided by countries.

Unfortunately there is no other approach to the information, since not only is the main arrangement by subject headings (never Willing's strongest point), but there are only a subject index (listing more specific subjects), a subject-group contents list, and a classified list (i.e.: a subject arrangement and three subject indexes). There is no means of finding a given title except by guessing the subject heading, and there is no country index. Rather unnecessarily, all three indexes are repeated in French, German and Italian.

Within the limits of its arrangement, however, the list may be found useful.

Willing's European press guide is published by Hutchinson Willing Ltd., price 5 gns.

Christmas party

Members are invited to the annual Christmas party at Aslib on Wednesday 21st December, from 5.30 to 7.30 p.m. Drinks, alcoholic and soft, and snacks will be served.

Admission will be by ticket, price 10*s* 6*d*, which should be obtained in advance from the Meetings Organiser, Mrs Elphick. Applications should reach Aslib not later than 5th December.

THE REVELANCE OF RELEVANCE TO THE TESTING AND EVALUATION OF DOCUMENT RETRIEVAL SYSTEMS*

ALAN M. REES
Center for Documentation and Communication Research, Western Reserve University

Evening Meeting, London, Tuesday 13th September 1966

Relevance in the context of testing and evaluation

THERE is some evidence of a slackening of interest in the testing and evaluation of retrieval systems. The estimated significance of this problem also appears to have decreased markedly. A literature search reveals the existence of less than fifty papers published to date in 1966, most of which do not report experimental activity. This dearth of significant effort may be due to a number of factors: investigators engaged in testing and evaluation have exhausted their repertoire; difficulty in undertaking further effort and at the same time satisfying more stringent experimental design requirements; realization that there never was any theoretical basis to testing and evaluation in the first place and that some basic-type research is necessary before beginning any new testing activity. It is disappointing to consider how little the work on evaluation has contributed to the improved design and optimization of information retrieval systems. Little agreement exists either with respect to the nature of the phenomena which we wish to subject to quantification (*what* we are testing) or as to the requisite methodology (*how* we are to test).

The seemingly bankrupt state-of-the-art doubtless stems from an oversimplification of the problems involved and from deficiencies in experimental design in many of the studies undertaken. It has been mistakenly believed that adequate testing methodologies exist. Further insight has still to be acquired into both what and how to test. Valid and reliable research cannot be undertaken by the use of intuition and rule of thumb procedures.

A recent critical review of testing and evaluation of document retrieval systems stresses that the methodologies used have 'failed to recognize many of the elements essential to good research'.[1] Specifically, the review argues that 'the major problems stem from the way in which the design comparisons are established, the selection of criterion measures, the use of insensitive measurement procedures, the lack of critical control considerations, the selection of sampling procedures and the choice of statistical tests'.[2] Bourne, writing in the 1966 *Annual Review of Information Science and Technology*, reaches a similar con-

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* Work performed under NSF Contract C-423. Acknowledgment is made of the assistance of Prof. D. G. Schultz, Prof. T. Saracevic and Mrs Leslie Rothenberg.

clusion. 'No one,' he observes, 'has ever had his test results verified, or expanded, or made more precise by another experimenter. Furthermore, the actual numerical values given for recall, relevance, or other factors for a particular indexing system would appear to have value only to that system. There is little point in comparing the recall figures of two separate experimenters when each uses a different definition of recall, different types of requests, and different types of judges, and when there are many other dissimilarities in the test environment.'[3]

We are all considerably wiser and more chastened in 1966 and it is appropriate to point out that much has been gained as a result of prior efforts. The impasse reached in testing and evaluation is largely due to the difficulties involved in establishing an operational definition of relevance. At the present time no practical substitute exists for the concept of relevance as a criterion measure for quantifying the effectiveness of document retrieval systems. The ultimate purpose and justification of retrieval systems is to optimize, for example, the research productivity of scientists and engineers or the clinical judgment of physicians and in this manner foster inventiveness, spark creativity or facilitate problem solving. Yet the degree to which any retrieval system can contribute to the optimization of these intellectual pursuits defies measurement. Since we cannot assess the covert satisfaction or impact of retrieval systems on the part of users, it is necessary to consider phenomena which are overt and reasonably explicit. For this reason, relevance is used as the criterion measure to quantify the phenomenon involved when individuals (users) judge the relationship, utility, importance, degree of match, fit, proximity, appropriateness, closeness, pertinence, value or bearing of documents or document representations to an information requirement, need, question, statement, description of research, treatment, etc.

Before discussing relevance in general and then our own work in particular, some definitions will be given which illustrate the role of relevance in testing and evaluation. The quantification of the effectiveness of any system involves a *criterion* (or criteria) such as a phenomenon or abstract description of variable to be measured (e.g., heat, heat transfer, current flow, relevance); a *measure* (measuring unit) in terms of which the performance of the system is to be quantified (e.g., kCal, BTU, ampere, recall ratio, sensitivity); a *measuring instrument* (yardstick) which might be a calorimeter, ammeter, wattmeter or, in the case of relevance judgments, the human judges together with the scales and judgment instructions involved—in this connection it is to be noted that humans are acting as the analogues of measuring devices and are subject to variation; finally, a *methodology* for achieving the measurements (the conditions under which a calorimeter or an ammeter can be properly utilized)—in the case of retrieval experiments this necessitates the selection of appropriate documents, judges, information requirement statements, measures, instruments, statistical procedures, etc., to be used.

These distinctions are vital and are often confused. Criteria for measures and even measuring instruments have been criticized and rejected on the basis of the methodologies used in particular experiments. It is, of course, unreasonable to expect an ammeter connected to a water tap to measure current flow or the performance of a power plant. Having employed such a poor methodology, neither the ampere nor the ammeter can be criticized.[4]

It is therefore obvious that any testing and evaluation of systems should first define the phenomenon or criterion being tested before proceeding to the selection of the measuring instruments. The instruments employed are dependent upon the nature of the phenomena to be measured, whilst the methodology used must take into account the criterion, measures, measuring instruments and the appropriate mode of applying such measures and instruments. Fuzziness as to the nature of relevance has led to a confounding of criteria, measures, measuring units, measuring instruments and methodology. Poor understanding of relevance has also contributed to a masking of the identity of those variables which must be controlled in experimental activity to minimize extraneous influences.

As a phenomenon relevance is complex. It is our belief that judgment of relevance by a user is the expression of the user's opinion as to how the information conveyed by a document matches, overlaps, complements and/or is useful to his conceptual framework or previous knowledge. The expression of such a match, overlap, etc., is subjective and partially unconscious on the part of the user. It is unreasonable to believe that documents have a fixed relevance to an expressed information requirement for all users at all times. We reject the notion that six ounces of relevance can be wrung like juice out of a document. We hypothesize that variability exists amongst and between different categories of relevance judges. Documents 'inform' various people differently so that their cognitive set must be taken into account in relevance judgments. Various types of judgment exist because of the different purposes for which information is required (use orientation).

We do not believe that any retrieval system or sub-system has a fixed performance figure so that uniterms are preferable to descriptors, links to no links or vice versa regardless of types of users, purpose, subject field, time and circumstance. Where relevance is used as a criterion it must be realized that precision ratios, sensitivity, specificity, etc., can be changed by varying the judges, measures, scaling techniques, information requirement statements, instructions or other aspects of the test design. There is no such thing as *the* relevance of a document to an information requirement, but rather the relevance judgment of an individual in a specific judging situation recording his judgment on a particular scale at a certain point in time. In view of this subjectivity in relevance judgments, what are the psychological and environmental variables involved? This is the starting point of our research.

Relevance research at Western Reserve University

The basic objective of our experimental work is to determine the patterns, variability and basis of relevance judgments.[5] We are concerned with the effect of four major experimental or independent variables: *stage of research, documents, document representations* and *relevance judges.* The purpose and justification of this activity is to gather a large amount of data which, when analysed and interpreted, will hopefully provide a more precise knowledge of relevance and the variables influencing relevance judgments. Underlying our work is the belief that the relevance judgment process should be studied in relation to observable and realistic intellectual activity. Ideally, we would wish to observe the judgment of documents and document representations with reference to ongoing research activity. Since this presents formidable obstacles, it was decided to provide for relevance judgments in the context of a completed research project. We believe that such a simulation will closely approximate real conditions of information searching and usage.

The project selected for the study of relevance judgments is in the biomedical field (diabetes research) and was undertaken by a Ph.D-M.D. experimenter in the Western Reserve University School of Medicine during the period from 1961 through 1963 under the sponsorship of the National Institutes of Health. With the co-operation of the biomedical experimenter and the assistance of a medical writer, three descriptions of the completed research project have been prepared to represent the project at three identifiable *stages of research* reflecting a time-task differentiation:

a preparation of proposal and identification of problem;
b conduct of experiment;
c analysis and presentation of findings.

It is hypothesized that relevance judgments will vary on the part of the judges among the several research stages described to them on the basis of:

a increased knowledge about the research project;
b changes in the information need from stage to stage.

The three stages selected and simulated are believed to represent different information needs existing in an actual research situation.

Another hypothesis continues to be that various *documents* will be judged differently with respect to their relevance at the several research stages; that some documents will receive a higher relevance rating at all research stages than other documents; and that some documents will be judged by members of a group of judges with a higher degree of consistency than other documents.

A set of documents has been associated with the descriptions of the research stages and judges are asked to assess the relevance of each document within the context of each research stage as described to them. Two *document representations* are presented in addition to each document–title and full bibliographic citation. The selection of document representation as a variable permits exploration of the effect of systematic variation of the completeness of information presented on the judgment process. It is hypothesized that, for any document, judgments will vary from representation to representation and between the representations and the full text.

Manipulation of variables will allow for the study of the relevance of particular kinds of information to the various stages of research and the effect of various bibliographic and other characteristics of documents such as name of author, institutional affiliation, list of citations, etc. It is hypothesized that these may be significant cues which trigger a relevance judgment. A standardized list of questions is directed to all the judges and in addition some judges are interviewed in depth concerning the basis for arriving at their judgments.

Another variable consists of the relevance *judges*. A judge is defined as an individual who judges the relevance of documents included within a given document set in reference to a stated or implied information need. Of particular interest in this connection is the influence on the judgment process of such factors as a person's educational and professional background, work involvement, and professional status. It is hypothesized that persons of differing educational and professional background, experience in biomedical research methodology, work functions (research, teaching, patient care, administration), vary significantly in their ability to orient themselves within a research environment and to formulate specific judgment criteria from a description of a research problem. Biographical information is elicited from the judges by means of questionnaires. Specifically, physician experts, biochemists and other biomedical scientists, medical librarians, and medical students are the experimental subjects studied. The three main groups of judges are those clinically oriented, those oriented towards laboratory-type research rather than patient care, and medical librarians. Both inter- and intra-group consistency is being investigated. Considerable effort is being expended in attempting to discover those particular characteristics of the judges which influence the relevance judgment process.

It has been suggested that success in literature searching is highly dependent upon the ability of the searcher to place himself within the frame of reference of the research generating the need for information and we hope that we may reveal the ability of various types of persons to orientate themselves within a research environment.

A dichotomous judgment of relevant or non-relevant has been rejected. Using standard psychometric methods a graphic rating scale has been developed which permits a more sensitive criterion measure. The scaling method will be varied in order to determine whether or not a specific rating method leads to a high concensus of relevance within judging groups.

One experimental session has been held with second-year medical students. In June two further sessions were held: one in Boston, in conjunction with the annual meeting of the Medical Library Association, to record the judgments of sixty-five medical librarians; and another in Chicago at the meeting of the American Diabetes Association for the purpose of obtaining the judgments of clinicians and experimenters in the field of diabetes. Two more sessions are planned for October: one for medical residents and another for basic medical scientists such as biochemists and physiologists.

Analysis of the resulting data utilizes three methods: analysis of variance, correlational techniques and content analysis. Analysis of variance is employed to determine the significance of differences between judging groups, documents, research stages and document representations. Through the utilization of analysis of variance techniques the singular effect of these variables upon relevance assessments and the interaction effects of these variables may be investigated.

Within groups, correlational techniques are utilized in relating background factors to relevance assessments and in examining the relationships among ratings of aspects of relevance in comparison to overall ratings.

Content analysis is utilized to summarize the responses and comments of judges during the interview that takes place after completion of the relevance judgments. These interviews will be utilized in an attempt to gain insight into the process of relevance judgment.

Three issues have been explored in the brief examination of some of the data which has been achieved since June. The first concerns the distributions of ratings for a single document on a particular rating scale in a given situation, i.e., for a given representation at a particular research stage. For this purpose the distributions were obtained for all the documents separately at one stage for the five aspects of relevance rated by the judges.* Inspection of the distributions indicated that all the points along the scale are being utilized, but that the dispersions are rather large.

The second question explored was the extent to which the judges agreed with each other. From each group of judges thirty cases were selected and all possible intercorrelations among the individuals were run for several rating situations. The results clearly indicate that the general level of agreement was considerably higher among the medical experts than among the medical librarians, although even among librarians the average intercorrelation is moderate.

The third group of analyses has been concerned with the kinds of differences in ratings that are associated with three of the major variables under investigation in this research—documents, representations, and research stages. Six analyses of variances were run on the medical librarians' responses in several different rating situations and two analyses of variance on the medical experts' responses. The selected and preliminary results suggest that there are significant differences in the ratings given by different individuals, on different documents, and at different research stages, but that there may not be significant differences among the several representations used in this study. Furthermore, the interactions among all these variables appear to be significant.

The statistical analyses completed thus far represent only a small portion of the work that will be carried out on these data, both now and as they are supplemented by the returns from other groups. However, they are suggestive of the kinds of findings and meanings that will be produced.

Towards a theory of relevance

It is our contention that the process of relevance judgment is objective under certain well-defined restrictions, with the result that relevance judgment is applicable as an instrument for measuring retrieval systems performance. These restrictions at the same time define our conception of what relevance judgment is.

Anybody receiving answers as a result of a literature search knows which are the ones he wants, i.e., those he can use as compared with those which are destined for the wastepaper basket. In addition, it is possible to order or rank the accepted answers on the basis of the information conveyed. A person at a given point in time then *can* and *does* perform a judgment. The factors that influence the judgment are numerous and most of them unknown to the person himself. However, as far as he is concerned, the judgments for that *document set* at that point in time are objective and absolute.

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* These aspects are: relevance to the research as described up to that point in time in the description presented; relevance to the formulation of the specific research problem described; relevance to experimental procedures employed; relevance to the problem of interpreting the findings of the research.

It is our contention that such judgments can be useful as a measuring instrument. The restrictions under which the judgments can be used are numerous and as yet not fully elaborated. Such judgments constitute a useful and objective measuring instrument for testing the performance of information retrieval systems when a specific, ordered and finite number of system *responses* is related by, and to, specific kinds of *persons* (*users*), performing specified *functions* in specified *subject areas* for a specified *purpose,* within a specified *environment* and within a certain limited point in *time.* To elaborate on these restrictions:

- *a* *User*: Judgments are made by and towards persons of certain personality education, experience and other factors that comprise their cognitive sets and maps.
- *b* *Functions:* Judgments are made by users performing certain work functions such as clinical practice, teaching, research, administration, etc.
- *c* *Subject Areas:* Judgments are made in certain disciplines, fields, mission or problem orientations (such as: diabetes research, information science) with specific reference to the subject in relation to which the judgments are made (e.g., glucose metabolism, relevance experiments).
- *d* *Purpose:* Judgments are made with certain purposes in mind such as: preparing a grant proposal; compiling a bibliography; solving a technical problem; writing a paper; devising a methodology; etc.
- *e* *Environment:* Judgments are made by users functioning in a certain environment such as: university medical centre; research laboratory; industrial library; etc.
- *f* *Time:* Judgments are made at a certain point in time in relation to the work performed such as the different stages in research or development.
- *g* *Responses:* Judgments are made on the basis of a finite number, specific type and specific order of systems responses, such as documents; graphs; abstracts; facts; etc. (Another person such as a librarian can represent or even be the system.)

Relevance is thus defined as a relation established by a judgment between system responses and the user and which incorporates all of the restrictions enumerated above and possibly others.

In a number of experiments evaluating the performance of retrieval systems, relevance judgments are performed by judges or juries of judges on the basis of short question statements of which they are not the authors. Such judgments made in reference only to the subject content of a question, without taking into account the restrictions listed above, reveal very little about either the nature of the relevance judgment process or the performance of retrieval systems in general.

Conclusions

The phenomenon of relevance, where relevance indicates certain relations, is the basic concept of retrieval systems. Knowledge of this phenomenon is at present largely intuitive and non-quantified rather than derived from experimental observations and consequent generalizations. The improvement of retrieval systems depends to a very great extent on the level of understanding of relevance and the factors influencing relevance judgments. It is possible to visualize systems having tags other than subject tags for documents depending on the type of knowledge of relevance discussed in this paper.

The design and evaluation of retrieval systems must be related to the behaviour of the user as the generator, requester and ultimate processor of information. Communication and information transfer involve the processing and application of information by users in addition to the acquisition, storage, retrieval and dissemination functions performed by librarians or retrieval systems operators. Document delivery cannot be equated with document usage. We must relate the comparative ability of systems to fish documents out of files to the ultimate utilization of information and this requires study of user behaviour. As Philip Abelson recently pointed out: 'The bottleneck in utilization of knowledge is not a shortage of publications or inadequate information retrieval. The lag occurs in the step between the pile of books on a man's desk and the transfer of that information to his mind. We need to devote much more energy to determining what is significant and then conveying it in concentrated form'.

If we are really concerned with facilitating information transfer in order to improve the research productivity of scientists and engineers, then it is profitable to turn at least some of our attention from the fashionable pursuits of debating the respective merits of classification schemes, subject headings, thesauri, links and roles and the like, and to consider the psychological and environmental variables which determine the need for, and processing of, information. We need to learn a great deal more about how information of various types is used at various stages in the actual research and development process.

Relevance involves taking into account both system and the user, in that documents retrieved by the mechanics of system operation are judged by humans. In addition to our own exploration, research in relevance is also being undertaken at the System Development Corporation in Santa Monica, California, by Dr Carlos Cuadra and Dr Robert Katter. It is hoped that the combination of a simulated, field experimental approach at Western Reserve and a laboratory-type, fixed effects approach at the System Development Corporation will result in an elucidation of the psychology of the relevance judgment process. I will conclude by quoting Cuadra and Katter: 'Variability in relevance assessments among different judges has been observed since the earliest days of information system evaluation. The phenomenon has usually been treated as an irritant to be stamped out or bypassed rather than as an appropriate object of attention.'[6] I hope that I have done the subject the justice which it deserves.

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Letter to the Editor

RELEVANCE ASSESSMENT

Dear Sir,

The very interesting account by Mr Rees of an investigation at Western Reserve University into the relevance assessment process (see pages 316–24) prompts the following comment.

The selection of information or documents for utilization by research projects is frequently performed in successive stages. In the first stage, the basis of selection is usually broad subject matching, specific authorship or some other single faceted criterion; at the final stage, the project scientist selects very critically from the material forwarded, taking into account a host of factors which, in addition to detailed subject matching, may include quality of the work, reputation and affiliation of the author, timeliness in relation to project progress, ease and cost of application, patentability, etc.

There may even be an intermediate stage in which an information scientist prunes and partly processes the first stage output before passing it to the final stage.

Only when the project scientist performs his own searching are these separate stages telescoped into a single multi-faceted assessment.

The word 'relevant', with its long-established subject matching connotation, is inaccurate as a description of the output from any of these three selection stages. It would be far better to describe the successive outputs as 'possibly useful', 'probably useful' and 'useful' respectively.

What is much more important, however, is to recognize that the experiment described by Mr Rees does not effectively simulate any one of these three stages of selection, least of all the final and most important one. In real situations, the project scientist is in intimate and continuous contact with a living, progressively developing research project ever responding by change of emphasis, sometimes even by change of direction, to rethinking stimulated by the discovery of 'useful' but hitherto unknown information. This is a far cry indeed from Mr Rees' assessors linked only by written descriptions to completed, and hence dead, projects no longer capable of response to stimuli of any sort. It would be naive to expect assessments of so-called 'relevance' performed, as it were, *in vitro* to correlate with *in vivo* judgments.

Yours faithfully,

P. F. COLE

BP Research Centre,
Chertsey Road,
Sunbury-on-Thames,
Middlesex.

26th September 1966.

RELEVANCE ASSESSMENT

Dear Sir,

Mr Cole's comment on the lack of realism in our relevance judgment situation is most interesting and we appreciate his carefully considered observations. Of course, there is a very significant difference between relevance judgments made *in vivo* by a project scientist engaged in dynamic and evolutionary research activity and judgments made in our simulated context, which is essentially static at each stage of research as described to our judges. The written descriptions of research stages employed by us are, however, not unlike the statements given by a researcher in an oral or written form to a reference librarian or information scientist upon delegation of a search. Any correlation of judgments between the principal investigator of the research project simulated by us and those of our judges is of incidental interest.

Our intention is rather to establish some empirical reference points with respect to relevance judgments. We are interested in determining *how* various categories of individuals—clinicians, basic science investigators, interns, residents, medical students, medical librarians—make their relevance judgment decisions, the consistency amongst and between these groups, the possible existence of consensual relevance and any significant correlations of psychological and environmental variables which might shed light on the nature of the relevance judgment process. Another matter of concern is the design of appropriate scales to measure relevance. Finally, we are attempting to gather empirical data which might shed light on document characteristics which perhaps trigger a relevance judgment.

The empirical nature of our work and that of Cuadra and Katter at SDC must be emphasized. The somewhat facile differentiation between relevance and utility assumed by Mr Cole deserves empirical clarification in addition to 'armchair' speculation. Preliminary analysis of our data does not point to such a clear-cut differentiation.

It is our belief that the degree of 'realism' built into our experimental design is adequate to ensure both a controlled experiment and the gathering of data useful for statistical analyses in relation to the hypotheses underlying our experimental activity.

Yours faithfully,

ALAN M. REES
DR DOUGLAS G. SCHULTZ

Western Reserve University,
Cleveland, Ohio,
44106 U.S.A.
28th October 1966.

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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Dutch Documentation Practice
DRS C. VAN DIJK

Co-operation in the Field of Documentation in the Netherlands
DR C. C. GRUTZNER

Developing User Independence
DR D. J. URQUHART

Developing User Independence
A reply to Dr Urquhart
IR. D. J. MALTHA

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Aslib Proc. vol.18 no.12 pp.335-370 London, December 1966

ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 18 **December 1966** **Number 12**

ASLIB CALENDAR 1966

December

TUE.6–WED.7.	Course on work with patents. Aslib.
WED.14–THU.15.	Biology Group joint conference at British Museum (Natural History).
WED.21.	Members' Christmas Party.

1967

January

THU.5.	Technical Translation Group. 3.30 p.m. Annual general meeting; 5 p.m. 'Translating a Chinese grammar from Russian into English', by R. Hardbottle. At Aslib.
THU.12.	Co-ordinate Indexing Group, at Aslib. 3 p.m. Annual General Meeting; 4 p.m. tea; 5.30 p.m. Evening meeting: 'Problems and solutions'.
TUE.24. (or THU.26).	Evening meeting at Aslib. 5 for 5.30 p.m. (See insert with this issue.)

February

WED.1.	Engineering Group Conference. 10.30 a.m. Aslib. See paragraph below.
WED.8.	Joint meeting with the Institute of Information Scientists at Aslib. 5 for 5.30 p.m. 'Evaluation of large-scale information dissemination by AIDS', by R. D. Kerr-Waller.
WED.15.	Scottish Branch meeting. University of Strathclyde, Glasgow. 7.30 p.m. 'Some aspects of library co-operation', by G. H. Wright (Hatfield).

March

FRI.31.	Scottish Branch Annual General Meeting and Conference. David Hume Tower, University of Edinburgh. 10 a.m.
FRI.31–SUN.2.	Aeronautical Group Annual Conference, College of Aeronautics, Cranfield.

April

FRI.14–SUN.16.	Transport Group Conference at Leicester University.

May

MON.15–WED.17.	Chemical Group Conference at Attingham, near Shrewsbury.

June

FRI.16–SUN.18.	Electronics Group Ninth Annual Conference. Ashridge House, Berkhamsted.

October

MON.9–THUR.12.	41st Annual Conference at Harrogate.

Engineering Group Conference:
Classification and coding in engineering

Slowly, industry is acknowledging the benefits (the most important of which are increased productivity and lower production costs) to be derived from the systematic application of classification and coding routines in manufacturing systems—particularly in inventory control and drawing office organization. Linked with this changing attitude and the growing acceptance of the need for more and better standardization is the emergence of a new engineering methodology, namely, group technology or family group machining, the essential philosophy of which is to group together those components which have similar methods of production.

These challenging and controversial developments in production management will be examined by four speakers in a one-day Engineering Group conference, to be held at Aslib on Wednesday, 1st February 1967.

In the opening paper, Mr G. A. B. Edwards (Manchester University) will set the scene as he explains the role of classification and coding as a management tool. Examples of actual economies obtained by an effective classification and coding programme will be given by Mr L. Evison (Ferranti Ltd) as he delineates the standardization developments in his company over the past ten years, and takes a brief look at the effect of metrication on existing code structure. The librarian's experience in commodity classification will be detailed by Mr B. C. Vickery (Aslib), who will be followed by Mr T. J. Grayson (Birmingham University) on industrial classification in the USSR. Of special interest in Mr Grayson's contribution will be the discussion of the LITMO and Kievskii codes.

The fees for the conference (including lunch at the Anglo-Belgian Club and light refreshment) are 3 *gns* for members of Aslib and 4 *gns* for non-members. Further information, application forms and programmes may be obtained from Mr D. Whale, Tube Investments Department of Technical Information, Rocky Lane, Birmingham 6.

Systems analysis at Lancaster

The Office for Scientific and Technical Information recently made a grant of £5,771 to support a systems analysis of the Library of Lancaster University. The eventual aim of this project is to construct a generalized mathematical model of library operations, so that management decisions may be made on a scientific, rather than on an empirical or intuitional basis. The Departments of Operational Research and Systems Engineering at Lancaster will be involved in the work, and two appointments have been made, with effect from the beginning of 1967: Mr Ian Woodburn, MA, has been appointed to the Library staff as Research Fellow, and will hold this post jointly with a Lectureship in the Department of Systems Engineering, and Mr Michael K. Buckland, BA, Dip.Lib., has been seconded from the Library staff to become Assistant Librarian (Research).

Co-ordinate Indexing in Economics and Management

The Liverpool School of Librarianship (Liverpool College of Commerce) is experimenting with the use of punched cards to test the value of co-ordinate indexing techniques when applied to the literature of economics and management subjects. Most applications of these techniques have been in the fields of science and technology, and it is hoped that the results of the Liverpool experiment will help to extend their use to the documentation and retrieval of commercial information.

The experiment involves the analysis, over a period, of articles in some fifty journals and the selective indexing of British government publications. The work is being done by Mr A. Maltby, BA, FLA, Senior Lecturer, and Mr K.G.E. Bakewell, FLA, AMBIM, Lecturer, with the assistance of second-year students.

Fellowships at Berkeley

The School of Librarianship and Institute of Library Research at the University of California have announced the following fellowships and assistantships for the academic year 1967–8: two Fellowships worth $3,000 each, and eight Research Assistantships worth $2,530 and $3,192, for study leading to the PhD or DLS degree; four Research Assistantships worth $1,012 and one Scholarship worth $600, for study leading to the MLS degree.

Anyone interested should write to the Dean, School of Librarianship, University of California, Berkeley, California 94720.

European companies; a guide to sources of information

The second edition of this directory is now published and has more than twice the content of the first. The whole arrangement is greatly improved and the appearance is now up to the standard of its contents.

There is a section on published sources of information on European companies in general, followed by sections dealing with published sources of information for specific European countries, together with information on company organization in these countries. In addition to fuller lists of directories for the individual countries, there is now a list of newspapers and periodicals containing company news.

Translations of the main headings found in the directories listed are given into and out of English and the ten other languages.

European companies is available, price 70*s*, from CBD Research Ltd, 114 High Street, Beckenham, Kent.

INSPEL

It has been brought to our attention that the subscription address given for this journal on page 175 of the July *Aslib Proceedings* is incorrect. The correct address is: Dr K. A. Baer, 1625 L Street, NW, Washington, DC 20036.

Instant bibliographies?

In 1959 (see *Aslib Proceedings* vol. 11, no. 4, p. 104) Mr R. Moss of Shell Research Limited made a plea for a photocopier which would copy, store and sort single abstracts. He now reports progress towards this ideal with a camera system originally developed for dental photography. This is the Polaroid Cu5

Close-up Land camera, equipped with a standard supplementary lens, to provide 1 : 1 prints of an area 3¾ by 2⅞ in. The self-contained developing and printing unit, which is probably the best-known feature of the Polaroid cameras, provides a print within a few seconds in a room lit only by normal daylight or electric lighting. Thus instead of taking the books to the copier one can take the copier to the books, and assemble a bibliography in little more time than is needed to locate the relevant items. The only disadvantage, he says, is the fascination which this process has for the other occupants of the reading room.

NEW MEMBERS

CORPORATE

Name	*Locality*	*Representative*
Ambassador College	Hertfordshire	J. McBride
Asian Regional Institute for School Building Research	Ceylon	Mrs R. Rungkat
Avon Rubber Co Ltd	Wiltshire	Mrs J. Bowden
Building Centre	London	Miss J. C. Dames
Centre-File Ltd	London	D. Barlow
Ceylon, Medical Research Institute	Ceylon	Director
Charterhouse Group Ltd	London	Miss S. Weir
Dalgety & New Zealand Loan Ltd	London	K. L. Verity
Endfield-Standard Power Cables Ltd	Middlesex	R. C. Milner
Expandite	London	Dr F. M. Merrett
Hayward Tyler & Co Ltd	Bedfordshire	A. S. Lall
Lime-Sand-Mortar Ltd	Yorkshire	G. E. P. Jackson
Manchester University Library	Manchester	Dr F. W. Ratcliffe
Manganese Bronze Group Research	Suffolk	Mrs D. A. Griffiths
Metropolitan Police, Forensic Science Laboratory	London	L. Morse
Ninham Shand and Partners	South Africa	R. S. Beckett
Overseas Containers Ltd	London	P. F. Bradley
C. J. Pell & Partners	London	W. W. Frischmann
School of Military Survey	Berkshire	J. H. Nealon
Southampton University, School of Navigation	Southampton	Miss C. Likeman
South Africa, Trade Union Council	South Africa	D. Frantzis
Vermont University, College of Medicine Library	U.S.A.	G. H. Hunter
Westminster Bank Ltd	London	J. R. Cadman
Westool Ltd	Co Durham	P. Tilmouth

INDIVIDUAL

Name	*Locality*
Bleasdale, C. H.	Essex
Carter, Miss J. B.	Hertfordshire
Cuthell, Miss A.	London
Klaar, Dr R. M.	London
Loh, K. A.	Malaysia
Macgregor, A. N.	London
Orpwood, J. L.	Kent
Owens, Miss Z. M.	Middlesex
Reardon, D. F.	Birmingham
Stubbs, Dr A. E.	North Wales

THE 40th ASLIB ANNUAL CONFERENCE AT SCHEVENINGEN, THE HAGUE

It might be said that librarians and documentalists are citizens of two countries—their own and Holland. It therefore came as no surprise when The Hague, with its associations of FID, Donker Duyvis and NIDER (the Dutch equivalent of Aslib) was chosen as the venue for the first Aslib annual conference to be held abroad.

This, the fortieth Annual Conference of Aslib, was centred on the Kurhaus, Scheveningen, and took place from Sunday 25th to Wednesday 28th September 1966. During the months before, the Aslib Meetings Department handled 427 bookings, and when the conference was finally assembled, almost a quarter of those present were from overseas or international organizations. Altogether twenty-two countries were represented. In addition, some twenty to thirty guests from the Netherlands itself attended various sessions.

The Scheveningen conference proved to be the first to attract students from the library schools, with groups from the Northwestern Polytechnic and Aberystwyth. For the first time, too, a special programme was arranged for the fourteen family members who were there.

The sessions included papers on Dutch documentation practice, co-operation in the field of documentation in the Netherlands, developing user independence, and management, the intellectual challenge. All these papers, and accounts of the discussion which followed them, are appearing in *Aslib Proceedings* this month and next.

An unusually wide choice of visits—a total of thirty-five—enabled members to see the Netherlands Postal and Telecommunications Services, the Netherlands Reactor Centre, the IBM Development Laboratory, the Royal Library, Royal Dutch/Shell Information Services, the Unilever Research Laboratories, the Technological Universities of Delft and Wageningen, and the libraries and information services of a number of Dutch government organizations, industries and institutions.

A popular feature of the conference this year was the working parties held one evening. Each consisted of a group of members who met for discussion, led by an expert in the field concerned. The subjects discussed were:

Co-ordinate indexing: scientific and sophisticated techniques (Leader: R. Snel)
The ABC of co-ordinate indexing: general basic principles (Leader: J. R. Stocks)
The psychology of the information user (Leader: Alan Rees)
Document reproduction (Leader: G. H. Wright)
Publicity (Leader: W. Ashworth)

Computer applications (Leader: Dr H. Coblans)
Microforms (Leader: H. de Mink)
Professional education (Leader: A. P. J. Edwards)

The conference ended afloat, with lunch and speeches on board the *M.S. Erasmus,* on a trip around the harbour of Rotterdam. The vessel had been placed at Aslib's disposal by the Netherlands Ministry of Arts, Recreation and Social Work, a representative of which, Dr B. E. M. de Hoog, was on board and addressed the conference. The Chairman of Council, Mr Julian Blackwell, replied.

DUTCH DOCUMENTATION PRACTICE

DRS C. VAN DIJK

Head, Central Documentation and Information Services, Royal Dutch/Shell Office, The Hague

Paper presented at the 40th Aslib Annual Conference, Monday 26th September 1966

ANYONE who has ever had to try and describe the educational system of his own country to an audience of foreigners, for example as background to an explanation of librarianship and documentation training, will know how difficult it is to find suitable terminology for this purpose. Every word bears the stamp of the social and cultural traditions of the country concerned.

In the world of libraries and documentation, with its strongly international character, this is not such a problem, but it is none the less true that the same words often have quite different meanings. This was recently shown very clearly in the difficulties experienced by a small working group which had been given the task of defining a limited number of terms for the Unesco Library Statistics questionnaire with a view to achieving unambiguous and reasonably comparable figures. When our French colleagues translate 'special libraries' by 'bibliothèques spécialisées' this is more than just a question of different linguistic usage. Whereas we in Holland tend to see the special nature of special libraries primarily in their function of catering for a limited readership, e.g. the staff of a business enterprise, a government department or a scientific institute, the French term makes it clear that there the stress is on the subject specialization of the collection.

In this introductory address I hope to contribute in a small way to better communication, so that while we try to speak one language—i.e. your own—those characteristics peculiar to *our* library and documentation system will become clear.

The library collection

It is a feature of Dutch libraries, at least of scientific libraries, that only a relatively small proportion of their collections consists of books in the Dutch language. For many years foreign books and periodicals have been predominant in our libraries. Before 1945 the bulk of the books was German, but since then English and American books have occupied the leading position. With the opening of the national frontiers after five years of isolation, librarians faced the enormous task of filling the gap that had arisen. The bibliographical organization had to be adapted to the new situation. The libraries made a valuable contribution to the necessary scientific, technological and economic reorientation.

The fact that the libraries are composed in this way means that at all levels the library staff, like their readers, have to be proficient in reading the three most frequently used languages, viz. English, German and French. The librarian often feels it his duty to ensure that a well-balanced collection prevents the user from becoming dependent exclusively on the literature of one country only. This means, for instance, that in a preliminary search a chemical literature researcher will not only consult *Chemical Abstracts,* but will also look at the *Chemischer Zentralblatt* and the *Bulletin Signalétique.*

Classification and indexing

In common with Dutch learning as a whole, libraries in the Netherlands during the nineteenth century and the earlier decades of the twentieth century were strongly influenced by developments in Germany. Cataloguing rules which take into account parts of speech and grammatical case betray their origin. During the last century the university libraries built up detailed classification systems in the contemporary German fashion. In Holland, unlike Britain, a library of any size with books arranged on the shelves simply according to a rough subject matter classification is practically inconceivable.

In the special libraries the UDC has been widely applied. This is certainly due in large measure to the fact that Donker Duyvis and his small band of dedicated colleagues played a great part in developing the UDC, and also to the desire, inevitable in a small country, to participate in an international system.

The fact, however, that indexing, unlike classification, has found comparatively little application here has another basis. One reason is that, as mentioned earlier, the literature collection to be made available to the readers is not at all linguistically homogeneous. Books or volumes of a periodical are indexed on the basis of the words used in the documents. Indexing a collection which is homogeneous as far as the language is concerned is in fact nothing more than an extension of this principle. However, when the collection is linguistically very mixed the problem of indexing becomes considerably more complicated. The indexer, and the user too, often have to translate twice, in fact, namely into the language chosen for the index, and into the conceptual system on which the terms used are based. For these reasons keyword systems will be found in Holland mainly by way of supplement to a classification system, or in certain types of documentation which have been drawn up entirely in one language, e.g. within large international concerns or organizations. Against this background should be seen the fact that despite the strong British and American influence in recent decades co-ordinate indexing has found relatively little application.

In the field of machine indexing Holland can lay claim to only one or two experiments. There is a strong tendency here to wait for developments abroad to reach such a stage that the results obtained there can be taken over economically. Faceted classification, which has attracted rather a lot of attention in the United Kingdom, is still of fairly theoretical interest in this country.

The business archivist

In addition to the collections of published material in libraries, there is another important source of information. Internal records, correspondence files, and reports, are looked after by the business archivist, who is responsible for maintaining a satisfactory flow of these private documents, and for arranging and in many cases indexing them. Competent central or centrally directed administration of a firm's own unpublished documents is being seen more and more as a *sine qua non* of efficient business management. In government departments, where well-organized archives are essential to the proper functioning of a free democracy, this problem has received earlier attention than in the business world. The fact that for the last ten years or more courses have been held on this subject has led to a distinct improvement, although the status of the business archivist is still not what it might be. In the meantime there is a growing realization that expert records management is an important aspect of business documentation.

In this context it is important to note that from the viewpoint of an integrated information policy it is becoming increasingly common for library management and records management, and the documentation based on them, to be under the same supervision. More and more people are beginning to understand that the flow, storage and retrieval of information is an aspect of business with its own character, no less than the flow of raw materials and products, cash and personnel.

The user

The nature of special libraries and documentation services is such that it is not collections and systems but the user and his needs which are of primary importance. Roughly speaking, public and university libraries cater for readers and borrowers, and the special libraries for users. For the user, reading is a necessary evil—he has better things to do. He aims at getting the information he needs for his purpose with a minimum amount of reading. If he is a specialist he will keep abreast of his subject by reading one or two professional journals in the principal languages. For the rest, the user must rely on a good documentation system, or better still on a documentalist specializing in his field, for his specific data, reviews, background information and—in the light of the flood of literature—for his general current awareness. Strictly speaking, there is no such person as 'the user'. There are many different kinds of user and various ways of using libraries and documentation systems. User studies are in their infancy in this country. In theory, the user is something of an unknown factor. In practice, however, this is not really a problem. In a smaller concern, the librarian, provided he is the right man, knows his customers, their requirements and their ways. In larger concerns there is the specialized documentalist or information scientist who works in close contact with a given group of employees and who is thoroughly familiar with the work pattern and information needs of his clientele. Considerable attention has been paid to the training of this expert.

Considerably less satisfactory is the situation with respect to the instruction given to the library user. Very few secondary schools have their own libraries and in various ways the public libraries do not occupy the position that they do in Great Britain. The university libraries do organize introductory visits for new students, and some even provide a little practical training. Nevertheless, in the actual study programme many faculties make no provision for any systematic acquaintance with or practice in the use of the literature in their special fields. There is scope for much improvement here.

Co-operation

The limited resources of a small country make co-operation essential; the short distances make it possible. Since this subject is to be dealt with separately, I shall make one or two comments only. The co-operation among more than two hundred scientific, public and special libraries in the union catalogues in The Hague and Delft means that a very large proportion of the material contained in the country's libraries is accessible to all interested parties. This co-operation, supported by the liberal lending policies of university, government department and industrial libraries, excludes for the time being the need for an NLL in Holland. The Royal Library and the university libraries consult regularly together on the acquisition of frequently requested periodicals which are not available in this country. Specialized union catalogues, such as that for economic literature in the Ministry of Economic Affairs, and for legal literature in the Peace Palace, provide the user with a convenient overall picture of the available material in a place where he also has bibliographic material and expert assistance.

In various fields there are what are known as 'documentation pools', based on co-operation between government bodies and private industries. Training is aimed at giving the documentalist a good idea of where he can find specific collections or documentation. The short distances and the general readiness of people to help one another mean that a documentalist needs only a few days to obtain a clear picture of what documentation is available in libraries or information centres in other parts of the country.

Organization

Good co-operation is, of course, dependent not only on accessibility but also on the right organizational framework and atmosphere. This side of things is looked after by the associations. The Netherlands Librarians Association (NVB) provides a forum where librarians from the various types of library can come together. It is important to note that membership depends not on professional qualifications, but simply on the fact of being professionally employed in libraries. The fact that the special librarians form a fully fledged and active section of the national library organization is a fortunate situation, one which I suspect is somewhat envied us abroad. The originally rather fierce controversy between librarians and documentalists has gradually died away. The NIDER, which is more an institute than an association, is a meeting place for specialists in the documentation field, but its Managing Committee also provides a point of contact for many organizations and concerns whose members are interested in documentation. Co-operation between NIDER and NVB, particularly with the latter's Section for Special Libraries, has grown steadily closer over the last fifteen years, and is promoted by the many shared memberships of managing and other committees. The more recent Netherlands Association of Business Archivists also participates in this co-operation. Joint committees and joint meetings or meetings with invited members from the other organizations are frequently held. From the start all action related to the problems outlined in the Weinberg Report was undertaken in common. In Holland with our limited numbers and funds we are simply obliged to work in unison if we wish to achieve anything at all.

The role of Government

The Government has always taken a very active interest in the affairs of the libraries. It has subsidized public libraries, maintained special libraries within its various departments and services, financed the university libraries and the Royal Library, with its responsibilities towards the national library system.

A State Advisory Committee on Library Affairs, comprising a group of librarians from different types of library, is moving gradually from the function of providing a forum for a number of prominent men to that of formulating policy on a national scale.

The situation as regards documentation and scientific information is somewhat different. Government departments have given rise to several effective documentation and information services, which assist not only their own organizations but also anyone who wishes to make use of them. An excellent example is the one I mentioned earlier, the Economic Information Service which forms part of the Ministry of Economic Affairs. From the outset NIDER has been subsidized in its task of promoting the study and development of documentation in this country. An instance of good organization is the system whereby our Patent Office makes its wealth of documentary material available at cost price via NIDER to interested parties. The credit for the openness of most Government documentation services is certainly due to the respective departmental heads. As a general rule, however, what has been achieved so far in this field is more the result of the enthusiasm and initiative of the staffs themselves than of any policy of deliberate stimulation from above. There is no organ for promoting such a policy. The Standing Committee on Government Documentation performs the useful task of co-ordinating a number of documentation services and Ministry libraries, etc., but is strictly limited in scope.

There is a widespread feeling that a more active role is called for from the Government. There is a whole series of problems and requirements awaiting solution or study, for instance, better training inside the universities in the knowledge and use of specialized literature; a chair of documentation; inventorization of available documentation and the establishment of a well-balanced national information network on the basis of what has already been accomplished through co-operation of those operationally involved in documentation; and a documentation research centre, especially in view of the emergence of the computer as an information processing machine. There is also a growing need for a central body to look after the determining of priorities and the allocation of some funds. Our Ministry of Education and Science has taken a few years to come round to the idea that it has a direct responsibility in respect of scientific and technical information, and to ponder the consequences of this responsibility. The Ministry would probably do well to adopt some of the vision and drive which led to the setting up of OSTI. By its support, both financial and other, the Government can create a favourable climate for meeting the challenge inherent in the information explosion and the technical advances which are taking place. The actual work must be done by librarians, documentalists and information scientists who will have to be still more fully integrated than at present into the scientific and technical community. Within the given limits of our situation we in Holland are trying to meet this challenge.

CO-OPERATION IN THE FIELD OF DOCUMENTATION IN THE NETHERLANDS

DR C. C. GRUTZNER

Secretary-General, Netherlands Postal and Telecommunications Services

Outline of a paper presented at the 40th Aslib Annual Conference, Monday 26th September 1966

OUR country has as many as 172 documentation and information centres, some governmental or semi-governmental services and private enterprises. Although this situation is not at all bad for a small country, one cannot say that constant and efficient use is made of the possibilities created by these services.

This is due to the limited number of users and the duplication of effort. One can hardly speak of documentation-mindedness and an efficient combination of effort in our country. It is therefore a task for the Government to stimulate documentation-mindedness in scientific and industrial circles, and to promote the co-operation of the documentation centres, in order to achieve efficient use of documentation material.

The Government can stimulate documentation-mindedness by including the subject of documentation in the curricula of the secondary schools and universities, and by supporting private enterprise in improving facilities.

Well-founded co-operation is a *conditio sine qua non* for:

a co-operation based on a practical division of tasks;
b an efficient use of the means and possibilities available;
c the laying of a scientific foundation for documentation work, the training of documentation scientists, and meeting the severest requirements of documentation research, etc.

Co-operation in documentation can be approached from two main viewpoints, the ideological and the economic:

1 The ideological aspects of co-operation

In establishing national co-operation between groups in several branches of documentation the following aspects are to be distinguished:

1.1 The strict necessity of collaboration in a small country
1.2 Recognition by existing groups of a common purpose
1.3 Willingness to co-operate in an active way without thinking of the profits in the first instance
1.4 Efficient communication between groups, to make the co-operation dynamic

In the past decade co-operation in documentation activities in the Netherlands has already, for certain interested parties, resulted in several documentation pools of periodicals in some fields (see Appendix A). We hope that a growing national documentation-mindedness will eventually lead to the centralization of information, resulting in one or more national documentation centres, so that more general use can be made of the information available. This is an objective that needs to be realized in the near future, especially in view of current divergent interests and the expansion of fields of interest.

After we have achieved efficient national co-operation, the next step would be to extend this to international co-operation, based on an international exchange of data and a task-division for the elaboration of literature. In certain fields of science and technology this has already been achieved for a number of interested groups, as is shown in Appendix B.

2 The economic aspects of co-operation

There are four different groups of subjects that come under this heading:

- 2.1 Reasons for co-operation
  - 2.1.1 The increasing number of publications
  - 2.1.2 The increasing rapidity of development in science and technology
  - 2.1.3 Increasing specialization in several sciences and branches of technology
  - 2.1.4 A growing need for documentation
  - 2.1.5 Shortage of documentation specialists
  - 2.1.6 Cost increases
- 2.2 Conditions for co-operation
  - 2.2.1 A round-table atmosphere and work on a strictly voluntary basis
  - 2.2.2 Partners should keep to the agreements reached
  - 2.2.3 A definition of the field in which collaboration takes place should be given in such a manner that gaps are avoided and duplication is excluded
  - 2.2.4 Certain practical measures, like a co-ordinating function of one of the partners, and a supervisory committee
  - 2.2.5 The same classification system should be used by all partners
  - 2.2.6 The pooling and listing of all periodicals in possession of the partners, which are of interest for co-operation
- 2.3 Objects of co-operation
  - 2.3.1 In the first instance, centralization, which makes possible *inter alia* the centralized acquisition of material, centralized deposits, centralized accession lists, centralized catalogues, mutual facilities for circulation of periodicals, general lending facilities
  - 2.3.2 In due course the ultimate object would be to achieve national documentation and information centres
- 2.4 Organizational aspects of co-operation
  - 2.4.1 The composition of one or more joint literature digests, weekly, monthly or bi-monthly
  - 2.4.2 The exchange of data on a national and international basis (between the national centres and those in foreign countries)
  - 2.4.3 The accomplishment of a task-division on a national and international basis of collaboration for the digestion of literature

3 Conclusion

There is a growing interest in scientifically dependable documentation. Some very important steps have already been taken to arrive at a broader development in this field. The task for the near future will be to achieve the ultimate object, national and international co-operation. Only in this way will it be possible to keep up with the ever-increasing pace of scientific and technological development.

APPENDIX A

National co-operation in the field of documentation (documentation pools) in the Netherlands

1 SAMCAD—co-ordinating centres of motor-car documentation
2 SAWEDO—co-ordinating centres of workshop technology documentation
3 Staff matters
4 VEDOC—economic traffic documentation
5 S.B.D.—co-ordination of applied economic documentation
6 Agricultural documentation
7 Central aviation documentation
8 Internal transport
9 Documentation centre for nuclear energy
10 Documentation for wood research
*11 Sport documentation
*12 Recreation
*13 Desalination of sea water
*14 Soil, water and air

*The documentation pools thus marked are well advanced in formation. The pools already in existence (numbers 1–10) are formed by seventy-five different concerns, institutes, Government departments and undertakings, and other institutions, the most important being:

a Members of six pools: The Post Office (PTT) and the KLM
b Members of five pools: Technical University of Delft and the Scientific and Technical Documentation and Information Centre of the Forces (TDCK)
c Members of four pools: Dutch Railways (NS) and Railways Workshop (Werkspoor)
d Members of three pools: Economic Information Service (EVD) and the Technical University of Eindhoven
e Members of two pools: Department of Social Affairs and Health, the Automobile Association (ANWB) and the Association of Dutch Municipalities (VNG)

APPENDIX B

International co-operation in the field of documentation, in which the Netherlands takes part (documentation pools)

1. Automation
2. Railway documentation (Technical committee of the International Union of Railways)
3. International Council for building research, studies and documentation
4. Telecommunication
5. Postal service

DEVELOPING USER INDEPENDENCE

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Paper presented at the 40th Aslib Annual Conference, Tuesday 27th September 1966

Introduction

IT is well known that the output of scientific literature is increasing year by year. Some say that it is doubling every fifteen years and others that it is doubling in half this time. No very accurate measurements of the rate of growth exist, but this does not matter as it is plain to see that already it is very difficult to find your way through the existing mass of literature and the position is obviously becoming worse. My task is to consider this problem from the point of view of the would-be user of scientific literature and to consider to what extent he can be helped by external services and to what extent he must learn to help himself.

Let us look at the genesis of this user. After leaving school he goes to the university, and during the first week in this entirely new environment he is shown round. Part of this tour, possibly sandwiched between the visit to the students' union and a tea for freshers, includes a hasty tour of the library. At that stage he has little idea of what his eventual library requirements will be. In time, with luck, he graduates and becomes a postgraduate research student. At first he may receive the impression that his supervisor knows all there is to know about existing literature in the narrow field in which he will work and that the library is there to hold the papers which his supervisor knows all about. Of course, his supervisor grew up like he did, believing that any intelligent man knows how to use a library and that the necessary skills are innate, and so we have a position in which the blind lead the blind.

The scientific community, from time to time, indicates that it is not entirely happy with the situation and from time to time various schemes are discussed in an amateurish sort of way as to how to deal with it. Often a scientist attempts to keep his own card index of the papers that interest him and then discovers that such a simple tool is not really complex enough for his requirements. At last, like a man drowning in a sea of information, he clutches at 'mechanical retrieval' and hopes the computers will come to his aid.

This hope that computers will solve the problems arises from a growing belief that they are a sort of universal panacea. This belief is helped by many librarians and information officers who, whilst they have no clear understanding as to what computers can and cannot do, nevertheless would like to have some to play with.

In this situation I think it is wise to try to go back to the basic requirements. It is clear, in the natural sciences at least, that an observation made in Moscow or Peking about the behaviour of atoms or electrons may be relevant to the work of a scientist in Washington or Amsterdam, but how does he discover this? Over a period of time the scientific community has built up, using manual methods, a number of guides to the literature. Bradford used to maintain that half the scientific literature of the world was not abstracted. I doubt whether this was really true. Tests by abstracting organizations of the coverage of their publications by consulting the literature of the NLL have indicated that they are finding about 90 per cent of the relevant literature. Even accepting this, there is a widespread fear amongst scientists that the process of abstracting is taking too long. Undoubtedly the abstract publication does not appear at the same time as the papers it abstracts and there may well be several months' delay. Clearly it would be a good thing if these delays could be cut down, but I am not convinced that it is a major defect of the present system. The speed of dissemination appears to be quite high. About half the items lent from the NLL were published in the last three and a half years. The major defect in the system, according to my observations, is the general ignorance in the scientific community of the wide range of guides to the literature which exists. If you examine a typical collection of postgraduate research students or academic staff at our universities, you will find that, in general, the chemist knows about *Chemical Abstracts* and the physicist about *Physics Abstracts*. I said 'in general', because I have even found exceptions to this simple rule. However, as a rule a chemist knows nothing about *Physics Abstracts* and the physicist knows little about *Chemical Abstracts*. You may think that this does not matter, but it is clear that when you are doing research work it is impossible to confine yourself and your interests to the subdivisions of science as defined by the Greeks over two thousand years ago. The physicist, in the course of his work, inevitably has chemical problems and the chemist uses physical apparatus. Undoubtedly the subdivisions between the sciences are becoming more and more diffuse.

Need for training

In this situation it seems to me most urgent that the scientist should be introduced to the structure of scientific literature as a whole. He can only read a very small fraction of it, but he should be aware of how to locate abstracting and indexing publications in any field.

I fear at this juncture, as I am talking to a meeting of Aslib, that there are many who may say that the scientist should rely more and more on using information officers. Certainly I think more information officers would be a good thing, but the number of them is still very small and the rate of increase is barely that of the scientific community as a whole. In view of the small numbers which are available, it appears to me that more and more librarians and information officers should be less concerned with attempting to carry out literature searches for their clients and be more concerned with showing them how to search efficiently for themselves.

Of course there are always dangers in generalizations. There are some searches, particularly in applied science, in which specific pieces of data, such as densities or specific heats, are required. Such searches are probably best done by information officers. But there are other less specific searches which it would be far better if the scientist requiring the information did for himself.

I do mean *himself* and not with the aid of a computer.

Let me try to explain this point. A, for reasons best known to himself, wants a literature search. He tries to explain his requirements to B. Of course, A does this imperfectly for two reasons. Firstly, it is never easy to explain an idea on the frontier of knowledge to somebody else. Secondly, A does not really know what he wants. In saying this I am not criticising A. This sort of thing is inevitable, because of the very nature of research. So B goes ahead. To be on the safe side he tends to make the search wider than it need be. If this produces too much he may go back to A in the middle of the process, but if he is using a computer he does not know what will happen until the search is finished.

Now, let us look how A would tackle the problem if he had to rely on his own efforts. If he is wise he might seek advice about what sources to try and where to start. Whether he does this or not, as he proceeds with the search he realizes that his initial formulation of his requirements was inadequate, so he changes his search programme. This would be very difficult for B to do, even with a manual search. So far no one has managed to programme a computer to do this sort of thing for itself.

The intellectual processes which go on when a scientist does a literature search for himself are obviously complex, but little is understood about them. If, in the future, computers are to be used for this task, much more must be known about these processes, particularly about the 'learning while you search' feature. To make some progress, it seems to me to be essential that the working scientist should take an active interest in this problem. However, their observations are not likely to be of value if they are ignorant of some of the elementary things about searching, so I think we must face up to the fact that more effort has to be devoted to training scientists to use scientific literature.

Here, by way of illustration, I should like to refer briefly to MEDLARS. I imagine that most of you know that, as a result of some work by human indexers in the National Library of Medicine in Bethesda, two computer tapes are produced. One of these is used for printing out *Index Medicus*; the other is the MEDLARS (i.e. Medical Literature Analysis and Retrieval System) tape. The two tapes relate to the same articles and fundamentally they use the same indexing system. The result is that there is nothing much a MEDLARS search can find which could not be found using *Index Medicus*, although it might take longer to find it in *Index Medicus*. This is probably one of the reasons why the NLL is receiving so few requests for MEDLARS searches and why some of the requests we receive might be done more economically manually.

Another reason why we receive so few requests for MEDLARS searches is so germane to my main theme that I must devote some attention to it. Despite the limitations of computer searching, it is necessary to make questions which are going to be handled by the computer more precise than is necessary for a manual search. To do this, users have to know more about indexing systems than the knowledge they acquire by accident. So at the NLL we have started to run some courses on the use of the MEDLARS system, both for members of medical library staffs and for research workers. It is clear that we do not wish to train people to use steam hammers to crack nuts merely because they have never learnt to use nut-crackers. So the MEDLARS courses have described not only the manual use of *Index Medicus,* but also the manual use of other bibliographical tools which might be useful in the medical field.

At first sight it may seem strange that an attempt to use a machine system has necessitated telling people more about the manual systems. Nevertheless, this is what has happened, and a peculiar result of this experiment to use computers for information retrieval might well emerge. It might be found that the experiment had raised the level of the manual use, but that the machine system was of little value. I would stress at this juncture that this is only a possible outcome of the MEDLARS experiment. Insufficient data has yet been assembled to justify any conclusion about it. I think it is most important that we should not just assume that all our problems are at an end merely because computers are being used experimentally. However, if the final results indicate that the MEDLARS approach is not useful, this would not mean that the MEDLARS experiment had been a waste of time. The MEDLARS system is only the first elementary step towards mechanical retrieval. It only permits us to search by machines an index which has been made by humans and which could be searched manually. Thus it is only an attempt at the mechanization of a manual process. Such attempts are a very long way from automation, or the development of a machine system. Such a system might start with primary publications as raw material, involve automatic indexing, the automatic translation of questions as normally expressed into searching programmes, the inclusion in those programmes of arrangements for adjusting the programme as the search proceeds (learning as you search) and end up as a critical bibliography. We are clearly a long way from such a system. Nevertheless, the sooner the scientific community realises this the better. The more the user knows about the problems of searching, the sooner somebody is likely to hit upon a machine solution to some or all of these problems.

Development of training

So my thesis is that it is important to train scientists to use scientific literature. The question arises whether this can be done and, if so, how. The past history of this subject is not very encouraging. The Royal Society Scientific Information Conference of 1948 had a recommendation on this subject which the Royal Society drew to the attention of all vice-chancellors, with no apparent results. It is true, of course, that since 1948 the number of publications about the literature of particular subjects has increased. Some of these publications may be excellent descriptions of their topics, but it appears that, in general, they are mainly unread by the audience we are considering. The trouble with this sort of publication is partly that it too often becomes a bibliography which is quite unreadable and partly that the approach to the problem is wrong. It seems to be assumed that physicists will want to know about physics literature only. In general, they do not, because they believe they know all about the literature of their own subjects. Their beliefs are, of course, ill-founded, but they do not know this and it is difficult to tell them so. Scientists will, however, admit to being uncertain about the guides to the literature in subject fields they have not studied. This is the starting point of the courses we have organized at the NLL. Our initial concept was that we must talk about the structure of scientific literature. Two of my colleagues have put the problem thus:

> 'It is important to know that scientific literature does not comprise a miscellaneous collection of papers, reports, and books, etc., but that it can be sub-divided into quite basic and fundamental categories. Moreover, it should be realized that these categories have come into being largely as a result of the information requirements of the scientist himself. It follows, therefore, that if a scientist can define his requirements, he can restrict his searching to one or more of the appropriate categories.'[1]

The second concept behind the NLL courses is that a scientist, whatever his discipline, must not limit his searching to bibliographies with apparently appropriate titles. For example, after courses at the NLL an engineer found useful material in *Leather Abstracts*, a physicist discovered more references than he could manage in *Chemical Abstracts*, and a biologist went away insisting that his department should purchase *World Fisheries Abstracts.*

The third concept behind the NLL courses is that the scientist should carry out searches in a subject field in which he has special interest. He wants to do this in any case, so it is only a question of guiding him.

To test these ideas we tried to attract some postgraduate research students to courses at the NLL. At first they seemed to come largely out of curiosity and a desire to get away from the laboratory for a week or two. Often they came with the idea that their supervisors knew all the really useful references. This particular illusion was soon shattered. As a result, the number of requests for research students to attend these courses increased rapidly. The last course advertised brought in 160 applications for twenty places. It was clear that the NLL had started something it could not continue to do by itself. But how could this teaching activity be transferred to the universities? The NLL had been in a peculiarly advantageous position in starting these courses, because its senior staff had been trained as scientists, and its reading room, which contains a concentrated collection of guides to the literature, is not heavily used by visitors and can at times be used as a classroom. These advantages did not exist in university libraries, which in the main have very few science graduates on their staffs and rarely have any seminar rooms in the library building.

The first problem, then, to be tackled was to see if arts graduates who were members of university library staffs could be trained to help scientists to use scientific literature. This approach to the problem required a fundamental review of what was necessary. We began by dividing the graduate staff of the NLL into three syndicates—'physicists', 'chemists' and 'biologists'—and each syndicate had to try, on an experimental basis, to teach the others about the literature of its field. This approach to the problem led to the evolution of a course, an outline of which has been set down by my colleagues elsewhere.[1] The course lasted about ten days and its main feature was practical work in the library, answering questions—the sort of questions which had been produced by the research students. As far as I can make out, the courses we have devised for librarians on the use of scientific literature are both shorter and more practical than those normally held in library schools. I do not think they are less useful because of this. In fact, because librarians in practice are concerned with showing people how to use literature in libraries and not with answering examination questions it seems to me they are more useful. The initial courses were undoubtedly successful, not only in showing university library staff how to use some of the available guides, but also in drawing attention to the absence of some of the important guides in some university libraries. Possibly the most important feature of these courses was that they gave the arts graduate far more confidence in dealing with inquiries from scientists.

Here, however, I should like to stress that the target is not to enable librarians to do literature searches for scientists, but to enable librarians to show scientists how to do their own literature searches.

Of course, it is more economic to train scientists in groups how to use scientific literature than to attempt to train them individually. This means that it is essential to create the atmosphere in universities in which seminars on the use of scientific literature will be supported. To help to create this atmosphere the NLL has been running short courses on the use of scientific literature for academic staff. These courses have consisted of a few lectures and discussions and an opportunity to do searches at the NLL with the assistance of appropriately trained scientific staff. So far I think we can claim that everybody who has attended one of these courses has benefited.

The efforts to start short courses or seminars on the use of scientific literature are bearing some fruit, as is reported elsewhere.[1] But there is a long way to go before scientists generally become aware of how to exploit scientific literature properly. I think substantial progress can only be achieved if the library and information world as a whole accepts the idea that its job is not to answer questions for clients, but to show them how to answer them for themselves.

This approach to the problem will necessitate a change of attitude on the part of individuals and organizations. When I refer to the NLL as a teaching library it sounds a little odd. It should not be so. All libraries should be teaching libraries.

The peculiar isolation of many of the existing library schools from sizeable libraries is something which needs changing. And finally, a library school should cease to be wholly concerned with training librarians and should be partly concerned with training scholars to use libraries.

[1] WOOD *and* BARR. *J. Doc.* 1966, 22 (1) 22.

DEVELOPING USER INDEPENDENCE: A REPLY TO DR URQUHART

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JUDGING from Dr Urquhart's outline of the situation in Britain, it would appear to have a good many points of resemblance with that in the Netherlands. Much of what he said I can fully endorse, and if I endeavour to reply to him this must not be thought to imply any criticism of his remarks, but rather, I hope, some further support of his thesis by reference to my own experience in this country. I therefore propose, first, to indicate the points of resemblance between the situations in our two countries, and then the differences, and thirdly, I should like to add something to Dr Urquhart's observations or enlarge on them.

The points of resemblance

1 Just as Dr Urquhart described, the young Dutch student who willy-nilly makes his first acquaintance with a scientific library does little more than cast a surprised and uneasy glance at the serried shelves, anxious to get outside again where he can breathe more freely. He, too, is led to believe that his professor knows everything—an impression many professors are only too willing to confirm. It is common knowledge among my colleagues that about half the students who pay their first visit to the library slip out again unobserved without finding or reading anything of interest. Should a friendly library assistant offer to help, they go through agonies of apprehension.

It is an unfortunate fact that this first acquaintance with the library creates a deep after-impression on the budding scientist, one that is not eradicated until he himself has reached the age at which he must be able to persuade colleagues and juniors that he has an encyclopaedic knowledge of his special field (not forgetting several other subjects he claims a perfect knowledge of in the hearing of those least able to judge). He gleans his wisdom from circulating periodicals he leafs through in an idle moment, from scanning one or possibly two abstract journals, or reprints passed on to him by colleagues and which he reads as a duty to a friend, or from a few international congress readings (whenever he can find time to listen to such tiresome activities as readings at congresses).

2 The post of information officer has also been evolved in Holland. An annual course lasting some eighteen months is provided by our Joint Committee and produces about fifteen certificated information officers a year. This may be rather fewer than are needed, but many smaller institutions or firms usually engage for this work certificated staff who have taken courses in special or

scientific librarianship, and find this suits their needs. In my opinion supply and demand are pretty well balanced.

The Dutch also adhere to the principle that the research worker is the best man to search the literature, provided he knows what he is looking for (i.e. he can formulate his needs), and also provided he knows enough about the bibliographical tools available to him. Unfortunately there is usually a gap in this knowledge, and this is where the information officer or documentalist can step in. Another principle is that information research undertaken on behalf of others can only bear fruit provided the inquirer and the information officer are in personal touch with each other. This is why in the training course for information officers literature reports are compiled on the instructions and with the guidance of a 'coach'.

3 We in Holland are very interested in the use of computers for documentation and try to keep up with the latest developments, but like Dr Urquhart we cannot yet regard the computer as anything more than an instrument for mechanizing administrative work now done by hand; in our opinion it is too early to think of it as a means of undertaking meaningful literature searches in answer to specific questions. So far the points of agreement.

The points of difference

1 A small country like Holland cannot be self-sufficient in the matter of research and has always needed to take account of international literature in every walk of life. Since Holland with its great volume of international trade is a country with a traditionally international outlook, foreign literature in western European languages has never been a closed book. Dutch research workers usually find no difficulty in reading French, German and English scientific books and articles, but balk at eastern European languages and such far-eastern languages as Chinese and Japanese. Hence the Dutch research worker is internationally minded in his reading and generally reads more literature in a foreign language than in his own. This is obviously a great benefit for the flow of information.

But, unlike Britain and other countries, Holland does not itself produce many bibliographical reference works of the same international standing as *Chemical Abstracts, Biological Abstracts,* and the Commonwealth Agricultural Bureaux abstracts journals (the only exception is *Excerpta Medica*). Consequently, except for patent and report literature, most Dutch documentation services are more concerned with assembling bibliographical source material rather than building up large-scale documentation systems of their own. In fact, only a few large central documentation organizations exist in the whole country.

2 To some degree this is compensated for by the very many small, special libraries with documentation systems of various sizes and (again owing to the smallness of the country) good personal contacts. Thanks to many organizations and committees, we are well acquainted with each other, and the inter-library lending system and other forms of co-operation, such as documentation pools, are also highly developed. Practically every library has first-rate reproduction facilities. In my opinion the net result is that we are less in need than Britain of an organization like the NLL, although before long we shall have to

seriously consider coming to some agreement about specialization in the various scientific and technical libraries.

5 Generally speaking our network of scientific and special libraries and documentation services, and the co-operation between all services, may be regarded as adequate, but the training of scientists in the use of scientific literature, the burden of Dr Urquhart's paper, is a different matter.

Unfortunately we have not yet advanced so far as Dr Urquhart with his courses for scientists and students. In 1965 we ran our first experimental course on 'Documentation through Information' for members of the Royal Netherlands Institute of Engineers. There were thirteen participants and the course consisted of two two-day sessions. Some months afterwards we held a refresher day on which participants were asked questions about literature searches, and we did, in fact, find that the course had improved the students' insight. This course will probably become a regular feature, and other groups have become interested in this kind of instruction. Since 1958 the Wageningen Agricultural University has been holding a series of courses for older students on bibliographical research and written reports; these include practical work supervised by the central library of the university. Other university libraries hold student information days, but these have not grown into courses. The Eindhoven Technical University is starting a similar course this year. At the University of Amsterdam Dr Groeneveld gives a course of sixteen lectures on documentation, but these are intended for students in librarianship, not as user instruction.

In a certain sense our Joint Committee's courses for literature information may also be regarded as user courses, inasmuch as during the session the participants have to write four literature reports unaided. But here again the courses cater more specifically for persons engaged as full- or part-time information officers.

This is why we are particularly interested in experiences in Britain, and certainly intend to follow Dr Urquhart's good example.

Broadening and deepening the scope of Dr Urquhart's theme

Dr Urquhart spoke about scientists tracking down their own scientific literature and advocated a kind of self-service store for this type of user. But his remarks only apply to one aspect of the whole subject, namely the scientific customer in particular; there are other aspects as well, for instance:

1 the self-service store itself, which can only build up a good clientele by aligning itself with the wishes and requirements of its customers and knowing how to attract them;
2 an entirely different kind of customer from the scientist, namely the 'man-in-the-street', the man working in industry. In other words, the flow of information to the user.

The self-service store itself

This point has so many different aspects that I can mention only a few, without discussing them. They relate to such problems as the following:

a Are our libraries really laid out in a manner likely to encourage people to use them, and do they have a sufficient number of hidden persuaders in the form of press-button systems, colour signal-lights and self-service equipment for attracting custom?

b Have our libraries enough facilities to enable scientists to browse undisturbed, or to fall asleep in an easy chair over an interesting book?

c Are our catalogues and other systems so well arranged that the 'average man' can use them without first having to solve crossword puzzles and cryptograms?

d Are our abstracts journals and other bibliographical tools really so easy to refer to as we like to think, and are we not inclined to provide too much information instead of too little? (It is little use compiling a list of eighty titles for the man off on a trip to Abyssinia tomorrow, who needs some information *today* on soil conditions there. In the same way, the industrial engineer dealing with a breakdown in a chemical process is only interested in discovering the source of the trouble without delay, not, at that particular time, in its theoretical background.)

e Are the indexes to our abstracts journals always issued on time, or are they several years late?

f Do we make sure our scientific information is presented in attractive covers, or do we still wrap it up in the kind of grey packing paper used by the village grocer?

g Last but not least, if we go on bringing out such an unsystematic mass of new serials, periodicals, serial and progress reports and reviews, are we not thereby helping to make confusion worse confounded in the scientific publishing world?

We are tackling these and other problems in Holland, but solutions or improvements come very slowly, and it may even take years of discussion with official bodies before a plan can be put into practice. However, some few examples may be mentioned, such as the mechanized lending system in the Delft Technical University Library, extensions to our library telex network, plans for mechanizing the central catalogues of the Royal Library, and the self-service equipment for document copying in many libraries.

2 *The flow of information to the user*

It is generally admitted that it is difficult to ensure the flow of scientific information to the actual consumer of that information, and this is further complicated by the fact that such information has to be 'translated' and supplied in the right amount and at the right time and place.

We in Holland are fully alive to these problems, and I think it fair to say that by and large we succeed in passing on, via the channels available to us, information required on international literature. A number of government departments are doing particularly sound work in this field, e.g. the Economic Information Service, the Government Trade Extension Service, the Technical and Scientific Documentation and Information Centre for the Armed Forces, the Centre for Agricultural Publications and Documentation (Pudoc), the Ministry of Education and Science, and the Ministry of Housing and Town

Planning. The Netherlands Institute for Documentation and Filing (NIDER) is also extremely active in this sphere. NIDER employs several different methods to make users more conscious of the value of documentation and information, and it also acts as a general information centre. In contrast to the flow of information on the scientific level, people in industry cannot be expected to assemble their own bibliographical data on all and every subject and occasion. Dr Urquhart's remarks have little or no relevance to this category of user of scientific literature.

The service to agriculture provided by my own Centre (the Centre for Agricultural Publications and Documentation (Pudoc) at Wageningen) may be taken as an example of the way in which bibliographical information is passed on to the user in Holland.

We make a basic distinction between active and passive information. By active information we mean the kind of information that is passed on without being requested, whereas passive information is expressly asked for. The most important source of active information is our weekly *Agricultural Documentation*, which gives in the form of abstracts a simple and readable conspectus of world literature of interest to Dutch agriculturalists. Every year we process about 250,000 pages of some six hundred periodicals and serials, as well as four hundred books and other publications, and out of all this material we compile only eight thousand abstracts. It is only a small selection, therefore, but one that caters specifically for this weekly's readers. The abstracts are divided into informative and indicative classes, depending on the importance of the article to Dutch farming. Some ten brief literature surveys are also included every year, and each number contains a very short two-page summary of the most important articles and commentaries on agricultural policy and economics.

Another publication is our monthly *Agricultural Aspects of the Common Market*, a current list of titles of literature on agriculture in the Common Market area.

A third publication is the quarterly *Pudoc Bulletin* specially intended for overseas consumption. This is a list of titles, in English, of all Dutch agricultural science publications.

Fourthly, there is our bi-monthly *Documentation East European Agricultural Literature*, which supplies information on Eastern European agricultural literature in a readily understandable form, viz. in German and English, these being languages that can be read without difficulty in Holland. *DEAL* circulates in Holland and abroad, and subscribers may avail themselves of such *DEAL* services as the supply of translations and abstracts.

Passive information consists of providing inquirers with bibliographical information, usually free of charge. For answering these queries we make no use of mechanical aids, but draw on such numerous and varied sources as abstracts journals, bibliographies, manuals, our own and others' card-index systems, bibliographical lists already compiled, and other documentation services.

Information is passed on in the form of letters, telephone or other oral information, and literature lists and reports. So far as possible every item of information is supplied in the form best suited to the user's needs, so that we are always very happy when customers make a personal call on us.

Our literature alerting service occupies a middle position between active and passive information. This service, which is not free, is based on orders. Pudoc may be requested to give continuous information on a single specialized subject. The alerting department then makes a daily search for articles on this subject in the nine thousand current periodicals and serials arriving at the Central Library of the Agricultural University and sends the information to the customer direct.

Our Centre has been built up from practical experience, and you will have noted from my review that there are many different ways in which information is supplied, although all of them are necessary in order to meet the different types of user requirements.

Other Dutch documentation and information centres have evolved in a different way, but have one feature in common—as far as possible they all cater for the special needs of their customers.

DISCUSSION

Mr P. E. Colinese (Central Electricity Generating Board) disagreed with Dr Urquhart's statement that the job of the library and information world was 'not to answer questions for clients, but to show them how to answer them for themselves'. Distance and language, for example, might prevent inquirers from obtaining answers, even if they had been told where to find them. Secondly, although inquirers often did not know initially what questions they should ask, after discussion with a competent information scientist they *both* knew and the search could proceed. Besides, little of the information officer's work was at the frontiers of knowledge, and most of the time scientists profited greatly from seeking the help of information departments.

Dr Urquhart replied that in the applied sciences information officers could do a good job, but there were in fact few information officers about and these would be more effective if they spent their time training users, particularly those users who are not yet sure what ideas they are looking for. In medicine already the NLL was getting better questions from researchers than from information officers, probably because there were few information officers in that field.

Mr A. C. Bubb (Royal College of Advanced Technology, Salford) remarked that not all university libraries were as black as Dr Urquhart painted them, although the amateur tradition of British librarianship had long meant that some of the nation's best bookstores offered the worst service. Dr Urquhart's efforts at Boston Spa should, he considered, be directed towards generating critical and persistent demands by university members on their own libraries. It was interesting to see the NLL develop from a sort of warehouse into an institution teaching librarianship.

Dr Urquhart replied that his aim was to educate the educators—to give library and information staff additional training in handling scientists, and to condition some academics and thus provide librarians with allies.

Mr B. C. Vickery (Aslib) said that university students who were going to enter industry needed to be taught the use of the literature just as much as those who would stay in academic life. University librarians engaged in such training should therefore consult industrial librarians as to the most valuable form of training.

Mr J. T. Graham (Watford College of Technology) said that students sometimes returned from a course such as Dr Urquhart's only to come to the information officer to ask how they should use the techniques they had been taught in order to answer a specific question. The information officer's reaction was often to reach for the telephone. The techniques of using non-library sources should also be taught.

Mr G. P. Henderson (CBD Research Ltd) said that such education was just as necessary for the business user. The main point was to make the user aware that, contrary to his assumption, an answer might exist in the literature.

Mr E. B. Jackson (IBM) said that the phrase 'the industrial user' covered a whole spectrum: research staff (for whom 'self help' is possible), development staff (who need rather more assistance from library staff), and production staff (whose needs have to be met almost entirely by library staff).

Mr G. J. Broadis (Southampton University) said that Dr Urquhart's work had more relevance to academic than to industrial life. In an academic library one expected the user to do his own searching, even though some assistance was given. This was far from the case in industrial establishments. Perhaps it was the responsibility of the technical colleges to encourage the sensible use of industrial libraries.

Mr K. R. Lenel (International Combustion) said that there was a great need to train young research people in literature use; only then could much duplication of research be avoided. Concerning industrial users, people in industry just did not have time to do their own searching, even if they knew how.

Mr F. Liebesny (British Aluminium) pleaded for a wider use of 'information laboratories'—on an analogy with language laboratories—where practical applications of basic principles could be communicated. These would familiarize students and users with the materials an efficient information centre should possess and which were often beyond the means of a small library in a college or library school.

Letter to the Editor

COMPUTERS AND PUBLIC LIBRARIES

Dear Sir,

As an ex-public librarian now within a data processing company, I was interested in the Aslib Working Conference on Computers in Public Libraries.

Many librarians are continually pleading for 'computer experts' to come to their aid. Since a 'computer expert' could be an electronic engineer, a logician, a mathematician, a programmer, a linguist, an accountant, a botanist, a doctor, a consultant, a systems analyst, a salesman (or any other plum-stone) it is difficult to advise them to which they should listen. From the questions normally asked, it should be a consulting systems analyst; but one wonders if such, without a special study of library problems, could offer much help.

In asking the expert if the library can have a system integrating all procedures from book selection and ordering, to the preparation of significant statistics, I feel that Miss Johnson is begging the expert's question in response. Public librarians should be asking themselves if they can build such a system—while momentarily forgetting the computer as a philosopher's stone.

Integrated schemes for book selection, ordering, and accounts, for example, present problems of national conformity among publishers, bookshops, and local authorities; and cataloguing implies the same conformity among at least neighbouring boroughs. If this scale of co-operation is possible then an integrated system is in its gestation period. The only help a 'computer expert' can give is to emphasize the necessity of preparation and standards; he cannot really be expected to put your house in order for you.

As one cannot buy an instant library, no one can hope for a ready-made system immediately replacing all administration previous to the computer. Libraries are selectively built to professional standards, and library management develops the same way. Library data processing must also follow the same path. Once the public librarian has decided what he wants from computers, and is capably prepared to impart his needs to the computer industry, he will begin to get what he wants. In theory anyone can have anything.

Name the electronic wonder, wave the magic gold, and it will be done. We know, of course, that Cinderella public services exist on more humdrum plumbum. Therefore coats are cut to fit the cloth. The tailor cannot provide the garment when unaware that the wearer needs a bolero or a trench-coat. If librarians want 'integrated systems', then they alone must define and build them. If they don't then the organization of the alternatives is also their problem. It's their efficiency which is being chanced. A computer system can be built to do anything, but what is important is how it's needed to be done. No computer expert should tell the librarian this.

There is the constant question of cost when audiences of librarians face the computer factions. One day someone will ask the librarian in return the cost of his library over one hundred years, and whether it has been a total waste. The librarian must be as evaluative over his management tools as he is over his bibliographical ones. As far as data processing is concerned, the answer is 'A lot of money—and you won't get it any cheaper without making your system receptive to automation'. Dr Lynch, in his *Journal of Documentation* paper (September 1966) used the word 'machinable'—and this is the concept that librarians should place before the machine.

The 'present climate' of local government expenditure will always be with us, and as the Town Hall emerges into the age of 'Shops, Offices and Railway Premises Act', it could get a great deal worse.

The economies do not lie in the choice and purchase of a computer but in the preparation for it. If librarianship is a true profession, then this preparation is an intrinsic part of the professional responsibility.

This letter is not intended in any way as an attack on Miss Johnson and her colleagues who have shown that they realise what data processing can be made to do and are aware that enormous problems exist. It is really intended as a plea to many other professional colleagues to lift themselves out of the fog, and not expect too much from the computer manufacturers, whose customer services are probably higher than any other industry.

When the pioneering really starts, I shall look forward to similar conferences, and definitely try to attend the next one.

R. D. GEE, F.L.A.
Technical Librarian.

Electronic Data Processing,
NCR Co., Ltd.,
206 Marylebone Road,
London NW1.
18*th October* 1966.

Miss Johnson replies

The points Mr Gee makes have never been disputed by the members of the Working Party, who, in fact, are proposing the setting up of a Standing Panel to examine the possibility of programming an integrated scheme of computer operations for public libraries. It is intended that systems analysts shall be represented on the Standing Panel.

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Romanian and French. 161 Rivermead Court, London SW6. Renown 1912.

TECHNICAL AND COMMERCIAL translations from English into Russian. Mrs O. Linsley, 31 Parke Road, Barnes, London SW13. Tel.: 748 8822.

TRANSLATIONS FROM TURKISH. All subjects. F. P. Scott, 4 Uphill Grove, Mill Hill, London NW7.

TRANSLATIONS: TECHNICAL, SCIENTIFIC, all west-European languages. J. Smuts, B SC (ENGINEERING), FIL, 12 Thorndene Avenue, London N11. LABurnum 7723.

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Leeds Education Committee

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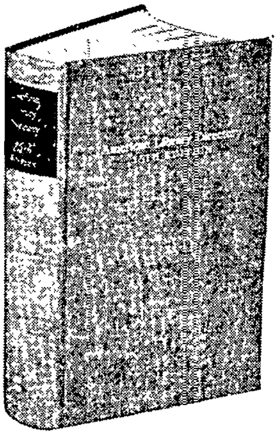

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